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Srovnání státních dluhopisů v Číně a USA
Comparison of Government Bonds in China and in the USA

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4. Development of Government Bonds in the USA
5. Comparison of Government Bonds in China and in the USA
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I hereby declare that I have elaborated the entire thesis myself. I have supplemented the provided annexes No. 1-3 myself.

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Contents

1 Introduction

Government bonds, including central government bonds and local government bonds, are the primary sources of revenue for all government levels in a country. When people talk about US Treasury bonds, they inevitably think of the upside-down yield curve. Treasury bond yield curve is one of the essential curves in finance. It can reflect investors' willingness to invest in all kinds of central government bonds.

The purpose of this paper is to compare Chinese and American government bonds with data. The thesis consists of six chapters, including introduction and conclusion. In chapter two, this paper introduces the characteristics of government bonds. Chapter three and chapter four focus on the necessary information about Chinese and American government bonds. Chapter five focuses on comparing the two countries, using a large number of data to compare the central government bonds and local government bonds of China and the United States in detail. Chapter five compares the government bond issuance and holder structure, local government bond supervision system, credit rating mechanism, and Treasury yield between the two countries.

By comparing the data and information of China and the United States, we can understand the current situation, advantages, and problems of government bonds between the two countries, which helps us understand the differences between the two countries.

2 Characteristics of Government Bonds

This chapter will describe some characteristics of government bonds.

2.1 Definition of government bond

A government bond is a debt security issued by a government to support government spending. Government bonds can pay periodic interest payments called coupon payments. Government bonds are considered low-risk investments since the issuing government backs them.

The central government issues central government bonds, and the local governm ents issues local government bonds.

2.2 Nature of government bonds

The nature of government bond mainly has two aspects: first, from the form, government bond is also a kind of securities, it has the general nature of bond. Government bonds have face value and investors can get interest when they invest in government bonds. Therefore, government bonds have the general characteristics of bonds. Second, from the function point of view, the government bond is only the means for the government to make up the deficit at first, but now the government bond has become an important means for the government to raise funds and expand public expenditure, and with the development of the financial market, it gradually has the function of financial commodities, and has become a tool for the country to implement macroeconomic policies and regulations.

2.3 Characteristics of government bonds

There are four main characteristics of government bonds.

2.3.1 High security

Government bond is a bond issued by the government, and the responsibility of repayment of principal and interest is borne by the government, which embodies the national credit. Among all kinds of bonds, the credit rating of government bonds is the highest. It is a safer investment choice for investors to buy government bonds.

2.3.2 Strong liquidity

Government bonds are the bonds of a country's government, and their issuance is generally very large. At the same time, due to the good credit and strong competitiveness of government bonds, the secondary market of government bonds in many countries is very developed, which not only allows trading on the stock exchange, but also allows trading on the over-the-counter market. The developed secondary market facilitates the transfer of government bonds and greatly enhances their liquidity.

2.3.3 Earnings are stable

Investors can get certain interest when they buy government bonds. The interest payment of government bonds is guaranteed by the government, with the highest credit degree and the lowest risk. For investors, the income of investing in government bonds is relatively stable. In addition, because most of the principal and interest of government bonds are fixed and guaranteed, the transaction price generally will not fluctuate greatly, and both parties in the secondary market can get relatively stable returns.

2.3.4 Tax free treatment

In order to encourage people to invest in government bonds, most countries stipulate that they can enjoy tax-free treatment for the income from purchasing government bonds. Therefore, when the nominal yield of the government and other securities is equal, investors holding government bonds can get more real investment income if tax factors are taken into account.

2.4 Central government bond

Central government bond is one of the components of government bond, which is very important for a country.

2.4.1 Definition of central government bond

Central government bond, also known as Treasury security, is a kind of government bond issued by the central government to raise financial funds. It is a

bond issued by the central government to investors and promises to pay interest and repay principal in a certain period of time.

2.4.2 The purpose of issuing central government bonds

Central government bond is one of the important components of national economy, which has the following functions.

Raising military funds

In the war period, the military expenditure was huge. In the absence of other financing methods, funds were raised by issuing war bonds. The issue of war bonds is a common way for governments in wartime

The first American War bond took place during the Second World War. In the middle of 1941, the United States was not a participant in the war, but it also felt that the war was approaching. On May 1, the U.S. Treasury announced the issuance of defense bonds, and President Roosevelt purchased the first defense bonds from the U.S. Treasury. On December 7 of the same year, Japan attacked Pearl Harbor. The next day, Roosevelt delivered a speech in Congress to declare war on Japan, and then the national defense bond was renamed war bond. .

Balance fiscal revenue and expenditure

By issuing bonds, the government can absorb the idle funds of units and individuals and help the country through the period of financial difficulties.

Raise construction funds

In order to build infrastructure and public facilities, the state needs a lot of medium and long-term funds. By issuing medium and long-term Treasury bonds, some short-term funds can be converted into medium and long-term funds, which can be used to build large-scale projects of the state, so as to promote economic development.

Repayment of matured Treasury bonds

In the peak period of debt repayment, in order to solve the problem of capital source of debt repayment, the state issues new Treasury bonds to repay the matured old debts, which can reduce and disperse the debt repayment burden of the state.

2.4.3 Classification of central government bonds

According to different repayment periods, Treasury bonds can be divided into fixed-term Treasury bonds and non fixed-term Treasury bonds.

Fixed term Treasury bonds refer to the Treasury bonds issued by the state with a time limit for repayment of principal and interest. According to the length of repayment period, fixed-term Treasury bonds can be divided into short-term Treasury bonds, medium-term Treasury bonds and long-term Treasury bonds. Short term Treasury bonds usually refer to the Treasury bonds with a term of less than one year, which are mainly used to adjust the temporary surplus and shortage of Treasury funds and have greater liquidity, such as Treasury bonds. Medium term Treasury bonds refer to the Treasury bonds with an issue period of more than one year and less than 10 years, which can make the use of debt funds relatively stable due to its long repayment time. Long term Treasury bonds: refers to the Treasury bonds (including 10 years) with a issuing period of more than 10 years, which can enable the government to control financial resources in a longer period, but the income of the holder will be affected by the currency value and price.

In the United States, there are three maturities of central government bonds. They are T-bills, T-notes, and T-bonds. T-bills is the abbreviation of Treasury bills, short-term bonds issued by the U.S. Treasury Department, with a term of no more than one year. T-notes is the abbreviation of Treasury notes, a medium-term bond issued by the U.S. Treasury with a term of no more than ten years. T-bonds is the abbreviation of Treasury bonds, a long-term bond issued by the U.S. Treasury Department with a term of more than ten years.

Irregular Treasury bonds refer to the Treasury bonds issued by the state that do not stipulate the time limit for repayment of principal and interest. Holders of such

bonds may receive interest on schedule, but they have no right to demand payment of debts. This is the case with permanent government bonds issued in the UK.

2.4.4 Treasury bond yield

Treasury bond yield refers to the ratio of the annual income obtained from the investment of Treasury bonds to the capital fund. It is an essential basis for investors to invest in Treasury bonds. The yield of Treasury bonds is different from the interest rate of Treasury bonds. The interest rate only refers to the ratio of the annual interest income of Treasury bonds to the face value of Treasury bonds, but the yield of Treasury bonds not only refers to the interest income but also includes the profit and loss of Treasury bonds trading and the income from the reinvestment of Treasury bonds interest. Therefore, the Treasury bond yield is a comprehensive measure of the size of Treasury bond investment returns.

After the purchase of Treasury bonds by securities buyers from a securities trading institution, the annual return (i.e. interest) that can be obtained by exchanging every hundred currency unit of Treasury bonds at maturity is called the yield of Treasury bonds. The calculation of the maturity yield needs to clarify the price of the current Treasury bonds, and assume that the investors hold the Treasury bonds until the maturity date, and the interest income is used for reinvestment and investment.

We use i for the yield, C for the coupon paid on the Treasury bond, P for the current price of the Treasury bond, and n for the number of years held. Its calculation formula is: (no more transfer after purchase, principal and interest received at maturity)

$$P = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \ldots + \frac{(C+\text{Face value of Treasury bonds})}{(1+i)^n} \tag{2.1}$$

Because some buyers do not always own Treasury bonds, they like a short-term investment, buying at a low price and selling at a high price. Another rate of return is the holding period rate of return. The calculation formula is:(P2 is the price of selling Treasury bonds and P1 is the price of buying Treasury bonds, I is interest income of investors during the holding period)

$$\text{Rate of return} = \frac{P2-P1+I}{P1} \times 100\% \quad (2.2)$$

2.5 Local government bonds

Local government bond is one of the components of government bond, it is very important for a region or a low-level government.

2.5.1 Definition of local government bonds

Local government bonds refer to the bonds issued by local governments or local public institutions with fiscal revenue in a country. Local government bonds are generally used for the construction of local public facilities such as transportation, communication, housing, education, hospitals and sewage treatment systems. Local government bonds are generally guaranteed by the tax capacity of local government.

There are two modes for the issuance of local government bonds: the first is the direct issuance of local government bonds; the second is the issuance of national bonds by the central government, and then the transfer to the local government, that is, the central government issues national bonds to the local government. In some specific cases, local government bonds are also known as "municipal securities".

2.5.2 Characteristics of local government bonds

The security of local government bonds is relatively high, which is considered to be a kind of bond next to central government bonds. Moreover, the interest income from investors' purchase of local government bonds is generally exempt from income tax, which has a strong attraction for investors.

2.5.3 Advantages and disadvantages of local government bonds

This part mainly introduces the advantages and disadvantages of local government bonds.

Advantages

Allowing local governments to issue bonds solves the problem of financial shortage of local governments. Local governments can use funds flexibly and solve

problems in development. Local governments have the ability to raise funds and develop independently.

Disadvantages

If the local government goes bankrupt, it will cause a series of problems, such as the responsibilities of the central government and the local government.[1]

[1] Invesco. Primer on Municipal Bonds. https://www.invesco.com/us-rest/contentdetail?contentId=96ca582c5ed1d510VgnVCM100000c2f1bf0aRCRD&dnsName=us

3 Development of Government Bonds in China

This chapter mainly describes the development of China's government bonds.

3.1 China's central government bond market

This part mainly describes the development of China's central government bonds.

3.1.1 The development of China's central government bond market

From 1950 to 1958, "People's Victory Public Bonds" and "National Economic Construction Public Bonds" were issued. They were aimed at state-owned enterprises and institutions, and were a kind of complete government behavior. They were illiquid.

From 1959 to 1980, this period was a "blank period" for Treasury bonds, and no Treasury bonds was issued.

From 1981 to 1987, the issuance of Treasury bonds resumed, and the issuance of Treasury bonds triggered by economic reforms (state-owned enterprise reform), but there was no primary market and secondary market. Therefore, the issuance of Treasury bonds adopted administrative distribution methods and began to have a certain market performance. Treasury rates and shorten the maturity of Treasury bonds. During this period, government bonds began to be issued to individuals.

The early over-the-counter markets appeared between 1988 and 1991. In 1988, China attempted to issue physical Treasury bonds through over-the-counter sales of commercial banks and postal savings, and the primary government bond market began to emerge. In the same year, the secondary government bond market (over-the-counter market) also took shape. In 1991, the secondary market structure of Treasury bonds, which was dominated by the over-the-counter trading market and supplemented by the on-site centralized trading market, basically formed. The issuance method in this period gradually transitioned from over-the-counter sales, off-take and underwriting to public bidding. The term varieties are basically 3-year and 5-year.

From 1991 to 1996, this was the period when the government bond market was dominated by the exchange. The establishment of the Shanghai Stock Exchange in December 1990 has for the first time formed a pattern where both on- and off-exchange trading markets coexist. In 1994, the Treasury department issued the first 6-month and 1-year short-term Treasury bonds. In August 1995, the country stopped all OTC markets, and the stock exchange became the only legal government bond trading market in China. Treasury bonds were gradually issued in a bidding manner, realizing the transformation of the issuance of Treasury bonds from the retail market to the wholesale market. During this period, the types of Treasury bonds became diverse. In 1996, the Ministry of finance increased the frequency of issuance of Treasury bonds and added Treasury bonds with a minimum term of 3 months, as well as 7-year and 10-year Treasury bonds.

From 1997 to 2001, this was the period when the interbank bond market was born and initially developed, and the OTC market was emerging at this time. In 1997, the People's Bank of China decided that all commercial banks would withdraw from the bond markets of the Shanghai and Shenzhen exchanges and establish a national interbank bond market. Institutional investors such as insurance companies and funds have gradually entered the interbank market. The interbank market has become a major component of the Chinese government bond market.

Since 2001, China's Ministry of Finance has issued 15-year, 20-year, and 30-year Treasury bonds. Since 2002, the government has continuously introduced new measures to promote transaction subjects, transaction types, the integration and unification of trading platforms, continuous innovation of products in the Treasury bonds market, continuous improvement of trading mechanisms, and the rise of the over-the-counter market.

In 2009, China's Ministry of Finance issued the first half-year interest-bearing 50-year Treasury bonds, becoming the third country to issue 50-year Treasury bonds after Britain and France. China's Treasury market has gradually formed a short-term, medium-term, and long-term term structure of different varieties with a period of 3

months to 50 years. The critical term varieties of Chinese Treasury bonds include one year, three years, five years, seven years, and ten years.[2]

3.1.2 Analysis of the current situation of China's central government bond market

This part mainly introduces the current situation of local government bonds in China from three aspects: market, issuing scale and regulatory system.

Treasury bond market

The issuer of the Treasury bonds is the Ministry of Finance of China. Treasury bonds are issued through the People's Bank of China bond issuance system located at CCDC. Only traditional certificate-type government bonds are issued through the counters of commercial banks. This issuance method has gradually withdrawn from the people's attention with the introduction of electronic certificate-type government bonds. Treasury issues include book-entry Treasury bonds, savings Treasury bonds (certificate), and savings Treasury bonds (electronic). People traditionally refer to traditional voucher-type government bonds as "certificate-type Treasury bonds." The pricing mechanism for the issuance of Treasury bonds is a public bidding and actively promotes the Treasury bond pre-issuance mechanism.

Treasury trading market

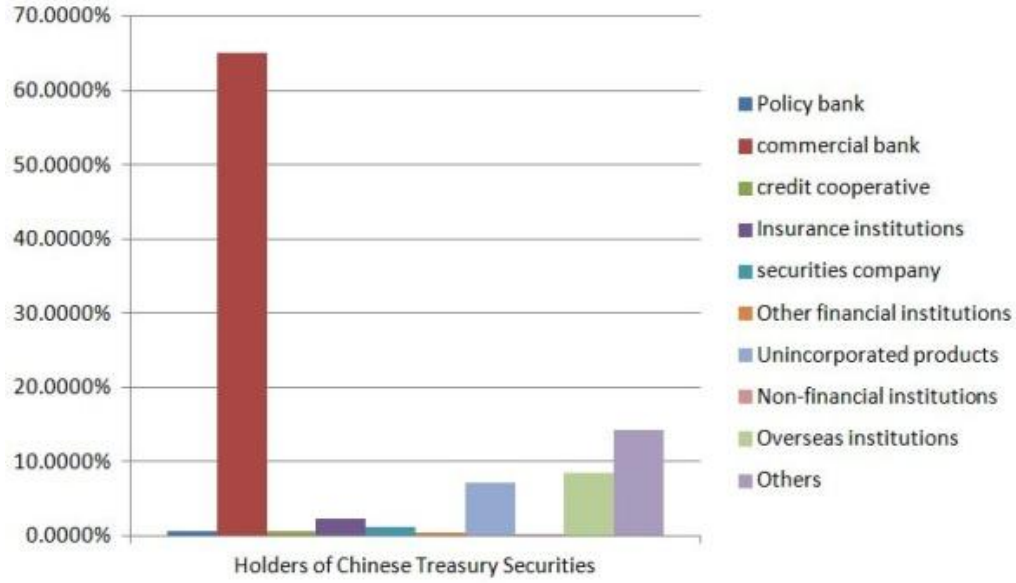
The market for Treasury bonds includes the over-the-counter market and the over-the-counter market. The OTC market is the inter-bank market and the over-the-counter market for commercial banks. The over-the-counter market refers to the exchange bond trading market (including Shanghai Stock Exchange and Shenzhen Stock Exchange). Treasury trading products include spot trading, repurchase and forward trading. Among them, repo transactions include pledged repo and buyout repo.

Treasury market participants include: Special settlement members, including the People's Bank of China, the Ministry of Finance, policy banks, exchanges, Central Treasury Corporation, and China Securities Regulatory Commission. Commercial

[2] Jiao Yanling. *Historical review and current situation analysis of China's national debt issuance* [J]. Shanghai Statistics, 2001 (01): 8-11. ISSN：1006-2726.

banks. Credit cooperative. Non financial institutions, including trust and investment companies, finance companies, leasing companies, auto finance companies, post offices and other financial institutions. Securities companies. Insurance institutions. Other financial institutions. Unincorporated products. Overseas institution. Other market participants.

Graph3.1: Holders of Chinese Treasury bonds in 2019



Source: China Central Depository & Clearing Co., Ltd.[3], author

Through the data chart of holders of China's Treasury bond in 2019, we notice that the distribution of holders is very uneven. The holding ratio of commercial banks alone is more than 60%, while that of other market participants is the second largest, but the ratio is less than 15%.

There are three main Treasury bond markets in China: inter-bank bond market, exchange market and counter market. The participants in the inter-bank bond market are mainly banks, insurance and other financial institutions, while the participants in the exchange market are mainly securities companies, non bank financial institutions and individual investors. The participants in the counter market are mainly non-financial enterprises and individual investors.

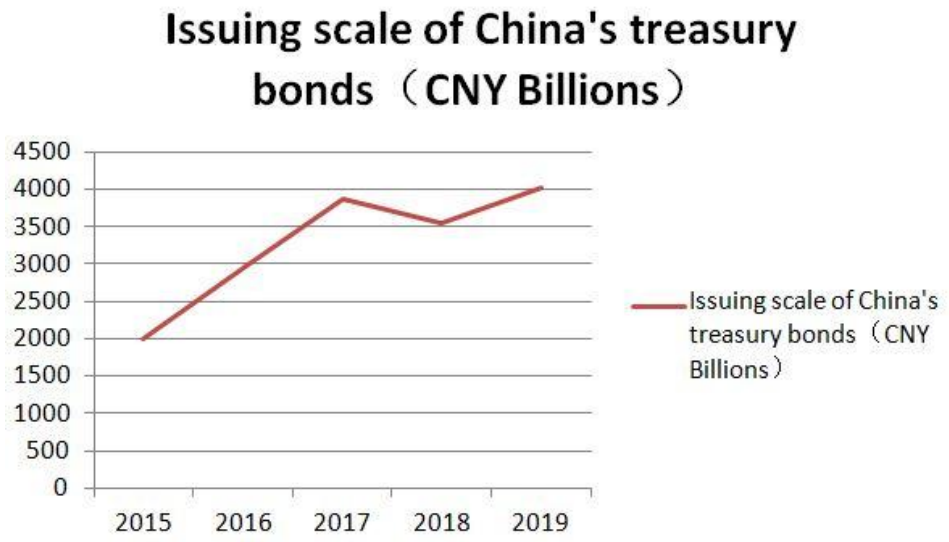
[3] China Central Depository & Clearing Co., Ltd.*2019 bond market statistical analysis report.* P15. https://www.chinabond.com.cn/cb/cn/yjfx/zzfx/nb/20200117/153611773.shtml

Regarding the pricing mechanism of Treasury bonds, including the bidding mechanism of the exchange market and the one-to-one inquiry mechanism of the interbank market + bilateral quotation mechanism (market maker).

Issuing scale of China's Treasury bonds

In recent years, the number of China's Treasury bonds is gradually increasing. In 2019, the issuance of China's Treasury bonds reached CNY 4009.1 billion, accounting for about 26.19% of the total number of bonds, and the issuance of Treasury bonds has been on the rise for five years.

Graph3.2: Issuing scale of China's Treasury bonds（CNY Billions）



Source: China Central Depository & Clearing Co., Ltd.[4], author

Regulatory system

China's Treasury bonds comply with basic regulations "Securities Law of the People's Republic of China" and "Treasury Securities Regulations of the People's Republic of China" and other basic regulations. Treasury market regulators are the People's Bank of China, the Ministry of Finance, and the Securities Regulatory Commission. The supervision of different markets is also different. The interbank bond market is regulated by the People's Bank of China, and the exchange bond market is regulated by the China Securities Regulatory Commission.

[4] Reference: Annex 1.

As the general custodian of China's bond market, China Central Depository & Clearing Co., Ltd. is subject to tripartite supervision, business supervision by the central bank and the Ministry of Finance, asset and financial management by the Ministry of Finance supervision, and personnel and organization supervision by the Chinese banking industry The committee leads and undergoes regular audits.

3.2 China's local government bond market

This part mainly describes the development of China's local government bonds.

3.2.1 The development of China's local government bond market

Compared with the Treasury bonds, the difference of the local government bond in China is that the local government is the main issuer. But China's bond market often also lists bonds issued by local enterprises as local bonds. From the late 1960s to the early 1980s, many local governments issued local bonds in order to raise funds to build roads and bridges. Some even have no interest and are apportioned to various units in the name of supporting national construction. Even more, they directly act as part of wages.

China's local government bonds first appeared around 1955. After the government bonds were restored in 1981, local government bonds were no longer issued. In 1993, local government bonds were explicitly cancelled by the State Council, because of the weak ability of local government commitment. Article 28 of the budget law, which came into force on January 1, 1995, clearly stipulates that local governments shall not issue local government bonds unless otherwise provided by law and the State Council. The ban on "local government bonds" remained in place until 2009.

China's first local government bonds are 2009 Xinjiang Uygur Autonomous Region government bonds, which were issued on the Shanghai Stock Exchange from March 30, 2009 to April 1, 2009. After the issuance, they will be listed on April 3, 2009.

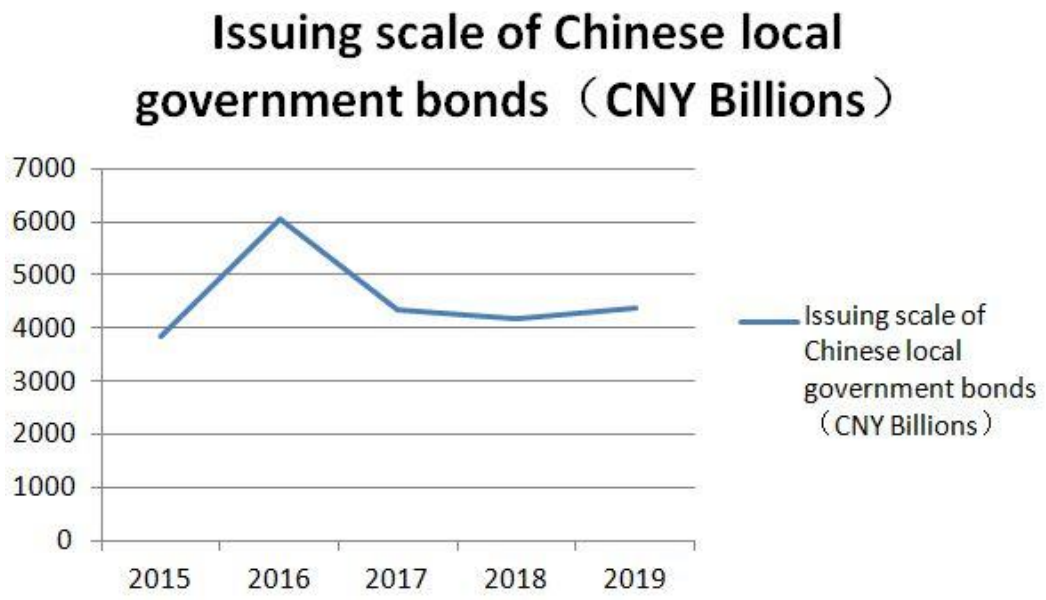
This bond is a fixed rate bond with an annual coupon rate of 1.61% and a term of 3 years. The interest is paid once a year. The value date of this bond is March 30,

2009, and the interest will be paid on March 30 of each year. The principal will be repaid on March 30, 2012 and the interest of the last year will be paid.

3.2.2 Issuing scale of Chinese local government bonds

In 2019, the number of local government bonds issued by the Ministry of Finance of China was about CNY 4362.43 billion, accounting for about 28.5% of the total number of bonds. In the past three years, the number of local government bonds has remained around CNY 4200 billion. Local government bonds have become an essential part of China's bond market.

Graph3.3: Issuing scale of Chinese local government bonds（CNY Billions）



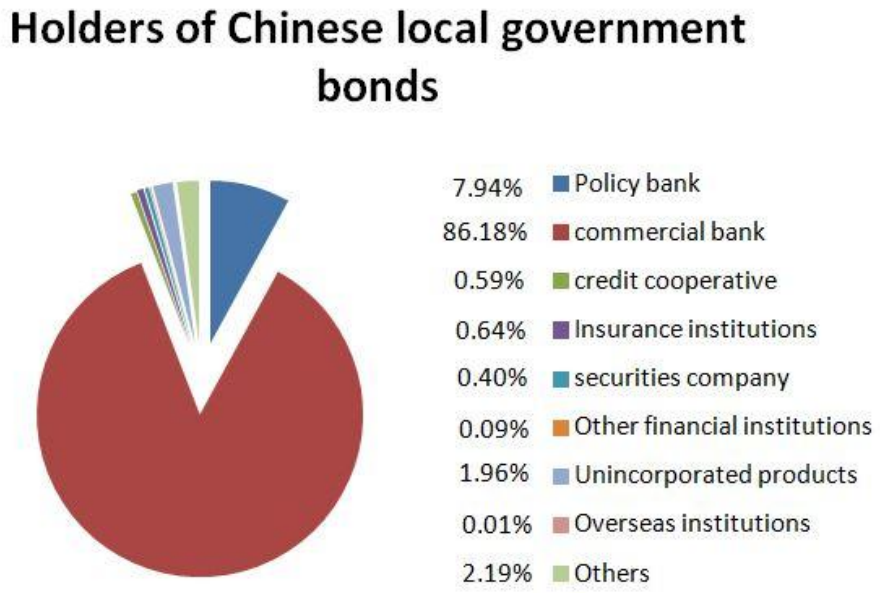
Source: China Central Depository & Clearing Co., Ltd.[5], author

3.2.3 Holders of local government bonds

The holders of local government bonds are the same as the holders of Treasury bonds, and their structures are almost similar. The proportion of commercial banks holding Treasury bonds is more than 60%, while the proportion of commercial banks holding local government bonds is more than 85%.

[5] Reference: Annex 1

Graph3.4: Holders of Chinese local government bonds



Source: China Central Depository & Clearing Co., Ltd.[6], author

[6] China Central Depository & Clearing Co., Ltd.*2019 bond market statistical analysis report.* P15. https://www.chinabond.com.cn/cb/cn/yjfx/zzfx/nb/20200117/153611773.shtml

4 Development of Government Bonds in the USA

The American bond market is one of the oldest bond markets in the world. The development of the American bond market can be traced back to 1792. To facilitate the sale and trading of American government bonds, the New York Stock Exchange was established, which was a bond exchange that year.

With the increase of stock issuance and trading volume, bonds gradually leave the exchange market. In the 19th century and the first half of the 20th century, the sale of bonds mainly depended on the salesmen employed by Wall Street. At the same time, bond trading has shifted to the over-the-counter market, but the trading is not active, because most bond investors adopt the investment strategy of buying and holding, which aims to obtain stable interest return.

Two oil crises in the 1970s and a series of economic and financial system changes triggered by them stimulated bond trading. The two oil crises resulted in high inflation and the collapse of the Bretton Woods system. The market interest rate rises sharply, the bond price falls sharply, and the fluctuation is extremely fierce, which makes the risk of bond purchase increase rapidly.

Another indirect result of the two oil crises is the rapid development of financial liberalization and financial globalization, which makes a large number of enterprises and local governments start to rely mainly on the bond market, rather than through bank loans to obtain direct debt funds. The result is the rapid growth of the bond issuance model.[7]

4.1 Central government bond market in the United States

This part mainly describes the development of central government bonds in the United States.

4.1.1 The development of US central government bond

After the founding of the country, U.S. Treasury bonds began to rise slowly. The first sharp increase in U.S. Treasury bonds was due to the civil war. U.S. Treasury

[7] David Lai. *U.S. debt: history, reality and Prospect -- tracing the mystery of U.S. Treasury bonds* [J]. International financing, 2011 (10): 20-25

bonds were $65 million in 1860, but in 1863 they were more than $1 billion. After the war, they increased to $2.7 billion. To ease World War I spending, it grew to $22 billion in the late 1910s. Participation in the Second World War raised the Treasury bonds from $51 billion in 1940 to $260 billion after the war.

In December 2009, U.S. President Barack Obama signed a bill to raise the U.S. government debt ceiling from $290 billion to $12.4 trillion. On August 5, 2011, as the U.S. government's deficit reduction plan failed to meet the standard of 4 trillion U.S. dollars expected by S & P, S & P lowered the U.S. government's AAA sovereign credit rating to AA+, and set the rating prospect as negative, which led to sharp fluctuations in the global financial industry. The downgrade is the first time the U.S. government's sovereign credit rating has been lowered since 1994.

According to data released by the US Treasury Department, in June 2019, Japan increased its holdings of US $21.9 billion in US Treasury bonds, while China increased its holdings of US $2.3 billion in US Treasury bonds. Japan surpassed China to become the largest creditor of the US.

4.1.2 US Treasury securities classification

US Treasury securities are divided into the following three categories.

U.S.Treasury Bills

The term is 13, 26, or 52 weeks, mostly sold at a discount. The minimum purchase amount is $10000, and the other denominations should be multiples of $10000.

U.S.Treasury Notes

It is an interest bearing security with a term of 2, 3, 5, and 10 years. All Treasury bills are fixed interest and are repayable at maturity. The minimum face value of the bond is $1000. If the term is less than four years, the minimum purchase amount is $5000. Other purchases should be a multiple of $1000. The issuance of such bonds accounts for about 60% of the total, which is the main form of US government bonds.

U.S.Treasury Bonds

It is an interest bearing security with a term of more than ten years. All securities have a fixed interest rate and are repayable at maturity. The minimum face value of $1000 and a large purchase should be a multiple of $1000.

4.1.3 The management system of the US Treasury bond market

The management goal of the US Treasury bond market is to obtain the lowest debt financing cost as far as possible, to ensure that it can provide credit for the government in the event of war or emergency, and to promote the formation of an efficient capital market.

The basic principle of US Treasury bond market management is to make Treasury bonds become risk-free financial assets, improve the liquidity of the Treasury bond market, issue bonds regularly, and enable financial institutions to prepare in advance and actively bid.

The U.S. Treasury market management system is mainly reflected in three aspects: planning, issuance, and circulation, which ensures the effective and rapid development and operation of the U.S. Treasury market and becomes the largest and most liquid Treasury market in the world.

The management system of the scale of US Treasury bonds

From the perspective of issuing scale, the current Treasury and the Federal Reserve negotiate to determine the management system of US Treasury bonds. The two sides will determine the annual issuance scale of US Treasury bonds, including the exact auction date and the type of Treasury bonds to be issued and announce the issuance calendar of US Treasury bonds at the beginning of the year. Market participants can learn about the issuance of Treasury bonds in advance in order to arrange funds reasonably, which is conducive to the smooth issuance of Treasury bonds.

In the scale management system, the main task of the Federal Reserve is to act as an agent of the Ministry of Finance for auction and sales, statistics of market

information, and joint supervision of the secondary market with the Ministry of finance[8].

The management system of the issuance of US Treasury bonds.

The current issuance of US Treasury bonds is based on the annual yield. The timing of the publication of Treasury bonds is fixed, and the Treasury Department distributes Treasury bonds of different maturities in different quarters, which is conducive to the sale of Treasury bonds.

The management system of the circulation of US Treasury bonds.

At present, the two laws *Amendment to the Treasury law* and *The Government Securities Law* supervise and manage the circulation market of U.S. Treasury bonds.

In the *Amendment to the Treasury law*, Congress gave the Treasury the authority to regulate the Treasury market. The federal regulatory agency supervises the Treasury bond market, and the Securities and Exchange Commission (SEC) is responsible for implementation.

The Government Securities Act provides for the duties and obligations of the U.S. government securities market. This Law gives sufficient protection to regulators and improves the supervision of the market, to ensure the smooth and orderly operation of the U.S. Treasury bond market.

4.1.4 An analysis of the current situation of US central government bond market

Treasury bonds are widely regarded by investors as one of the safest bond investments because of the credit guarantee provided by the US government. Unless something inevitable happens, the principal and interest will be paid when they are due. The longer the bond term is, the higher the interest rate will be, but the greater the risk investors will bear because investors have to bear the risks of inflation and credit. However, compared with other bonds, 30-year bonds are also very safe. Treasury bonds also have the advantage of tax exemption on investment income, which will significantly increase investors' desire to buy.

[8] Jiang Qin. *Management system of US Treasury bond market* [n]. Securities times, October 19, 2018 (A10)

4.1.5 The problem of US Treasury bonds

At the end of 2018, the yield of US Treasury bonds was reversed for the first time since 2007, which led to the continuous decline of the US stock market. Hanging upside down lasted about nine months. Scholars are very sensitive to the inversion of the yield curve because empirical data show that the inversion of the yield curve often means that the economy may go into recession.

Graph4.1:10-Year T-bonds maturity Rate

Source: Board of Governors of the Federal Reserve System

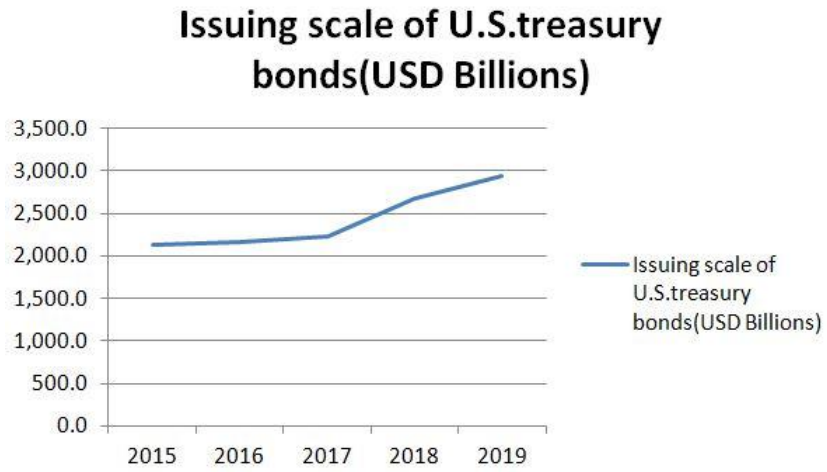
The inverted yield curve refers to that the long-term yield is lower than the short-term yield. According to liquidity preference theory, in a healthy market, because people prefer to invest in short-term and medium-term products, the level of short-term and medium-term interest rates will be lower than that of long-term interest rates. In 2019, the long-term yield level in the US Treasury market was lower than that in the short and medium-term. Investors expect the country's long-term economic weakness, and the central bank advocates low yield policy, so the long-term interest rate will be reduced.

4.1.6 Issuing scale of U.S. Treasury bonds

In recent years, the number of U.S. Treasury bonds is gradually increasing. In 2019, the issuance of U.S. Treasury bonds reached $2935.5 billion, accounting for

about 35.86% of the total number of bonds, and the issuance of Treasury bonds has been on the rise for five years.

Graph4.2: Issuing scale of U.S.Treasury bonds(USD Billions)



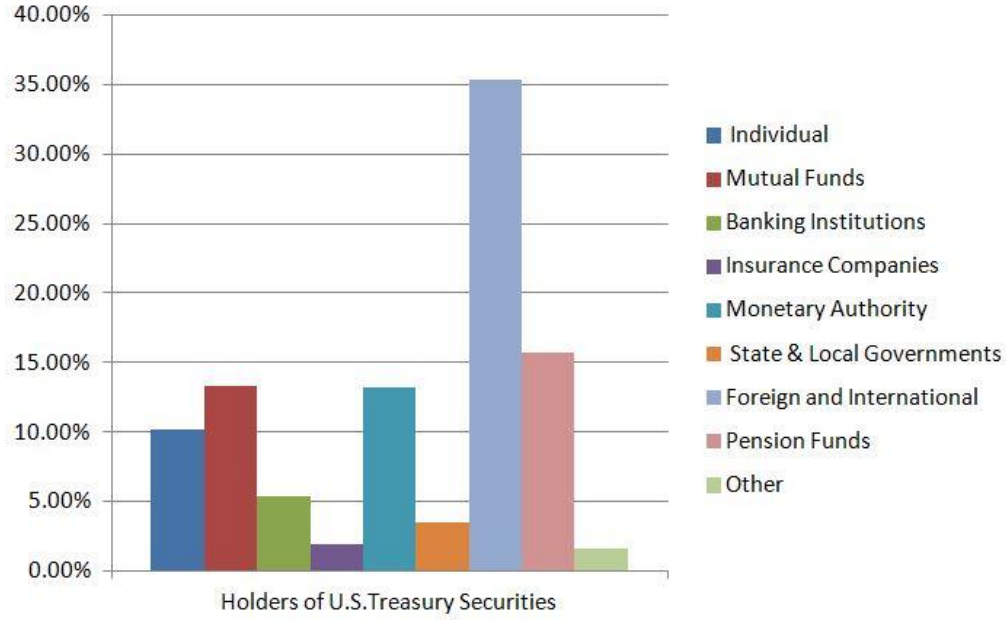
Source: Sifma[9] , author

4.1.7 Holders of U.S. Treasury bonds

The holders of U.S. Treasury bills are composed of Individual, Mutual Fund, Banking Institutions, Insurance Companies, Monetary Authority, State & Local Governments, Foreign and International, Pension Funds and Other. Each holder holds an average proportion, of which the largest holder is Individual.

[9] Reference: Annex 2

Graph4.3: Holders of U.S. Treasury bonds



Source: Sifma[10], author

4.2 Local government bond market in the United States

American local government bonds, also known as municipal bonds, originated in the 1920s in the United States. Civil construction needs many funds. American local governments issue municipal bonds to raise funds.

4.2.1 Definition and classification of local government bonds in the United States

U.S. state and local governments or their agencies issue municipal bonds to finance general municipal expenditures or specific municipal projects, such as schools, environment and housing, and other public investments. Municipal bonds are divided into general obligation bonds and revenue bonds.

The government that has the right to collect taxes may issue a general obligation bond. The government has the general right to collect taxes to guarantee the bond. The government uses the tax revenue to pay the principal and interest of the bond. With the support of all taxes, investors usually think that the general aggregation bond is the least risky municipal bond.

The government's revenue guarantees revenue bonds from the use of public facilities. Revenue pays off the principal and interest of bonds.

[10] Reference: Annex 3

The risk and interest rate of revenue bonds are higher than that of general obligation bonds.

4.2.2 The characteristics of municipal bonds in the United States

There are three characteristics of American municipal bonds.

Tax reduction and the exemption

The outstanding feature of municipal bonds is that their interest income is exempt from federal or state income taxes. Interest income on bonds for public investment is exempt from federal income tax. Bonds used for private investment are subject to federal income tax but are exempt from local government income tax. The vast majority of municipal bonds are issued for public purpose now.

High credit rating

The credit rating of municipal bonds is only lower than that of central government bonds. Through the credit rating of financial intermediaries and the implementation of the bond insurance system, the investment of municipal bonds becomes safer and more reliable. In the United States, about fifty % of the local government bonds by financial institutions or insurance companies guarantee, some commercial Banks also provide short-term credit guarantee for local government bonds.

Low-interest rate but high after-tax yield

The bond credit rating and the bond interest rate have an inverse relationship. The higher the bond credit rating, the safer the investment, the more investors, and the lower the bond interest rate.

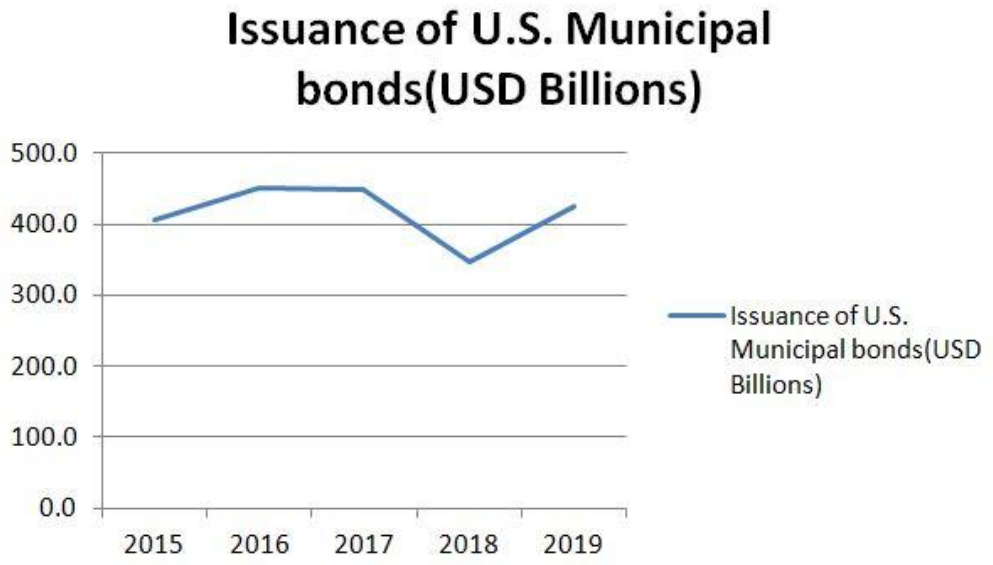
Under the same conditions, the credit rating of US central government bonds is higher than that of local government bonds, and the interest rate of US Treasury bonds should be lower than that of municipal bonds. However, because municipal bonds enjoy the tax-free treatment and attract a large number of investors, the interest rate of municipal bonds is lower than that of central government bonds. Still, the after-tax yield of municipal bonds is higher than that of central government bonds.

4.2.3 Issuers of local government bonds in the United States

Municipal bonds are issued by U.S. state and local governments and eligible not-profit corporations.

The issue volume of us municipal bonds is far lower than that of U.S. Treasury bonds. In 2019, the issue volume of U.S. Municipal bonds was the only $425.9 billion, and the issue volume in the past five years has remained around $415 billion.

Graph4.4: Issuance of U.S. Municipal bonds(USD Billions)



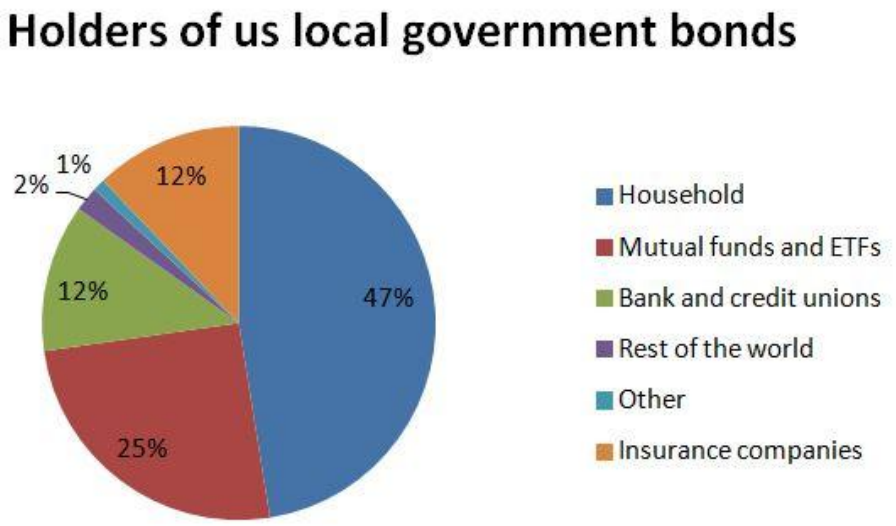
Source: Sifma[11], author

4.2.4 Investors of local government bonds in the United States

In the United States, investors in municipal bonds mainly include households, mutual funds and ETFs, commercial banks, and insurance companies.

[11] Reference: Annex 2

Graph4.5: Holders of us local government bonds



Source: Invesco, author

Since the mid-1950s, the leading investors in the United States have been household investors, commercial banks, and insurance companies.

Commercial Banks are traditional investors in municipal bonds, and *the 1986 tax act* removed an exemption for Banks from the 80% interest cost of municipal bond purchases. Hence, the demand for municipal bonds fell.[12]

In recent years, due to the increase in the marginal tax rate of the U.S. Government, the attractiveness of local government bonds to household investors has increased, increasing the investment value of municipal bonds and a significant increase in the proportion of household investors.

The profitability of insurance companies is usually cyclical, with insurers buying more municipal bonds to pay less tax in high-profit years and investing less when losses arise.

4.2.5 Risk prevention measures of local government bonds in the United States

In the historical process of local government bond development in the United States, there are not only successful cases of promoting local economic development, but also painful lessons of bringing financial risks. Therefore, local governments in

[12] Li Wei, Mou Hui. *Characteristics and issuing mode of American municipal bonds* [J]. Economic guide,2004(01):48-50.

the United States regard risk management and strict supervision as the premise of bond market development. At present, local governments in the United States have formed a set of strict supervision and management system.

Credit rating system

Investors usually rely on the credit rating of rating agencies to judge the reputation of a municipal bond. At present, the most authoritative rating agencies are Moody's and Standard & Poor's.

We can see from the report of Moody's on default rate of municipal bonds in 1970-2018 that Moody's divides the credit rating of municipal bonds into seven levels. Aaa is the highest level, which represents the lowest risk of municipal bonds. Caa-c is the lowest level, which represents the highest risk of municipal bonds. The lower the level of municipal bonds, the higher the default rate, and the longer the holding period, the higher the default rate.

Graph4.6: Average Cumulative Default Rates of Municipal Bonds

Municipal Default Rates Lower than Global Corporates for All Broad Categories
Average Cumulative Default Rates, 1970-2018, Municipals vs. Global Corporates

Municipals

Rating	Average Cohort Count	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Aaa	1,008	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	6,981	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%
A	4,877	0.00%	0.01%	0.02%	0.03%	0.03%	0.04%	0.06%	0.08%	0.09%	0.11%
Baa	672	0.03%	0.11%	0.22%	0.35%	0.48%	0.63%	0.76%	0.89%	1.02%	1.13%
Ba	111	0.25%	0.69%	1.12%	1.62%	2.03%	2.34%	2.71%	3.06%	3.38%	3.65%
B	23	2.84%	5.63%	8.31%	10.41%	12.52%	14.04%	15.09%	15.85%	16.71%	17.91%
Caa-C	11	9.20%	14.42%	17.79%	19.65%	20.90%	22.17%	23.12%	24.15%	25.14%	25.75%
Investment-Grade	13,538	0.00%	0.01%	0.02%	0.03%	0.04%	0.05%	0.06%	0.08%	0.09%	0.10%
Speculative-Grade	145	1.32%	2.47%	3.47%	4.31%	5.05%	5.62%	6.13%	6.59%	7.03%	7.47%
All Rated	13,683	0.02%	0.04%	0.05%	0.07%	0.09%	0.10%	0.12%	0.14%	0.15%	0.16%

Global Corporates

Rating	Average Cohort Count	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Aaa	105	0.00%	0.01%	0.01%	0.03%	0.08%	0.13%	0.19%	0.24%	0.30%	0.37%
Aa	414	0.02%	0.06%	0.11%	0.19%	0.29%	0.39%	0.51%	0.61%	0.70%	0.78%
A	869	0.05%	0.15%	0.32%	0.50%	0.72%	0.96%	1.22%	1.50%	1.80%	2.10%
Baa	827	0.16%	0.43%	0.75%	1.13%	1.52%	1.93%	2.33%	2.74%	3.20%	3.70%
Ba	455	0.89%	2.44%	4.23%	6.13%	7.91%	9.55%	11.03%	12.47%	13.95%	15.48%
B	553	3.33%	7.87%	12.54%	16.80%	20.66%	24.11%	27.19%	29.84%	32.24%	34.28%
Caa-C	315	10.03%	17.59%	24.00%	29.42%	34.02%	37.63%	40.78%	43.71%	46.34%	48.23%
Investment-Grade	2,215	0.09%	0.23%	0.42%	0.65%	0.89%	1.15%	1.41%	1.69%	1.98%	2.28%
Speculative-Grade	1,322	4.03%	8.11%	11.98%	15.43%	18.43%	21.01%	23.25%	25.25%	27.11%	28.79%
All Rated	3,537	1.53%	3.04%	4.42%	5.62%	6.64%	7.51%	8.26%	8.92%	9.55%	10.13%

1. Average CDRs are computed by averaging cohort CDRs for cohorts formed every month starting from January 1, 1970.
2. Historical ratings have been adjusted to be consistent with the Global Rating Scale as described in Appendix G.
Source: Moody's Investors Service

Source: Moody's Investors Service, *U.S. Municipal Bond Defaults and Recoveries,1970-2018*,P.8

In the evaluation of general obligation bonds, commercial rating agencies mainly evaluate four fundamental aspects.

The first is the information about the debt structure of the issuer to determine its total debt burden. The second is the ability of the issuer to maintain a sound budget policy. The focus is usually on the issuer's total operating capital and maintaining a budget balance of three to five years. The third aspect involves the determination of the specific amount of local tax and government indirect income that the issuer can obtain, and the collection of historical records about the dependence of tax collection rate and local budget on specific sources of income, in which the tax collection rate is essential when examining the amount of property tax collection. The fourth aspect is the evaluation of the issuer's overall social and economic environment.[13]

[13] Long Jinwei, Ouyang Ningbo. *The practice of American local government bond issuance and Its Enlightenment to China* [J]. Modern commerce, 2007 (16): 30-32

For revenue bonds, the important principle of rating is whether the financed project will generate sufficient cash flow to meet the requirements of bondholders. The rating method is the same as that of general obligation bonds.

Insurance system of municipal bonds

Insurance of local government bonds began in the United States in the 1970s. Insurance plays a vital role in the issuance of local government bonds. To improve the credit rating of local government bonds, insurance companies will participate in the publication of local government bonds.

When the issuer of the bond is unable to pay the principal and interest of the bond, the insurance company shall bear the obligation of repayment. Therefore, bond insurance does not provide insurance business for low credit issuers.

The bond insurance system of the local government can enhance the guarantee of bond payment. Municipal bond has the same market attribute as the insured bond, which expands the trading ability of bondholders. High rating insurance companies provide insurance services for bonds, so the bond rating will also be high. At present, Aaa-rated insurance companies mainly include American municipal bond insurance company, financial guarantee insurance company, and municipal bond insurance association.

Information disclosure system of municipal bonds

In order to prevent the fraud of the local government bond market, the Securities and Exchange Commission adopted a new market transaction disclosure principle in 1995, which requires local government bond issuers to update information regularly.

After the local government bonds are listed, qualified audit institutions shall give opinions on the issuer's financial situation, debt burden, solvency and other aspects.

For general obligation bonds, it is necessary to investigate the local financial ability to repay debts and the overall debt situation. For revenue bonds, audit institutions need to check the profitability of enterprises using public facilities and predict the income cash flow and solvency.

5 Comparison of Government Bonds in China and in the USA

China and the United States are two countries with totally different political systems, and there are also many differences in government bonds. Comparing the bond market scale, bond types, holding institutions of Treasury bond, liquidity of secondary market, information disclosure, and debt protection mechanism of the two countries can help us to have a deeper understanding of the bond market of the two countries.

5.1 The scale and type of bond market

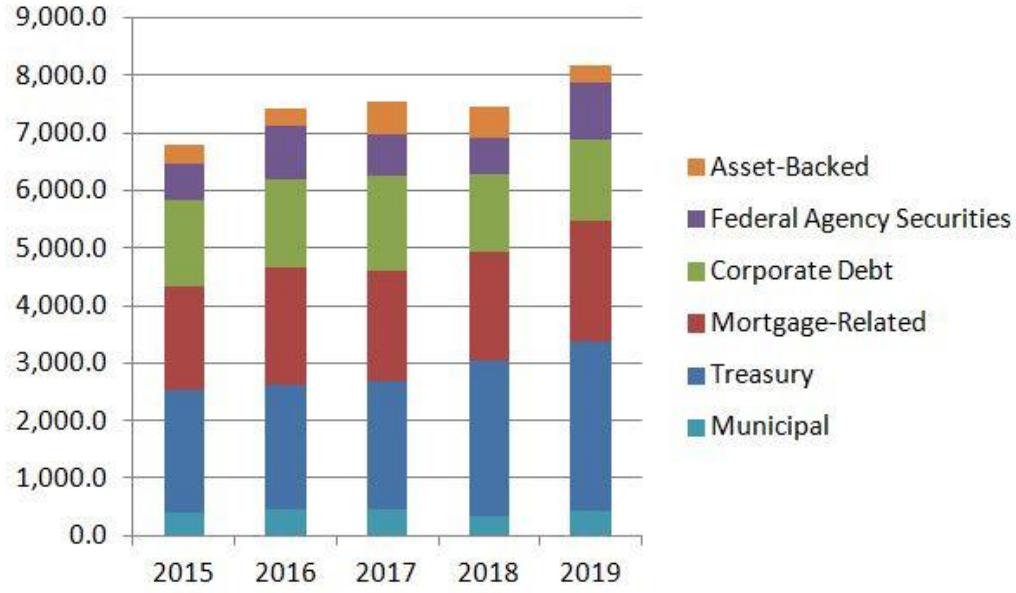
This section mainly describes the bond market details of China and the United States**.**

5.1.1 The scale and types of bonds in the US bond market

The U.S. bond market has a large volume of issuance and a relatively well-developed bond variety. There are many kinds of marketable bonds in the market, including Treasury bonds, municipal bonds, mortgage-backed bonds, and asset-backed bonds, corporate bonds, federal agency bonds, and money market instruments.

The issuance in the U.S. Bond Markets was $6797.8 billion in 2015, this figure was $7438.0 billion in 2016, this figure was $47531.9 billion in 2017, this figure was $7440.2 billion in 2018, and this figure was $8186.1 billion in 2019. Total issuance up 20.42% in five years.

Graph5.1: Issuance in the U.S. Bond Markets $ Billions



Source: Sifma[14], author

The U.S. bond market is growing year over year in total issuance, with municipal bonds increasing year over year in issuance.

5.1.2 The scale and types of bonds in the Chinese bond market

The total number of issuances in China's bond market is increasing year by year, and the variety of bonds is relatively comprehensive with great potential for development. By the end of December 2019, the issuance scale of China's bond market has reached CNY 27040.053 billion. In this chapter, the largest bond market: China central repository & Clearing Co., Ltd. is the calculation basis. Due to the numerous categories of the bond market, it is not conducive to calculation and statistics, so we approximate the bond market of China Central Depository & Clearing Co., LTD., which is equal to the Chinese bond market.

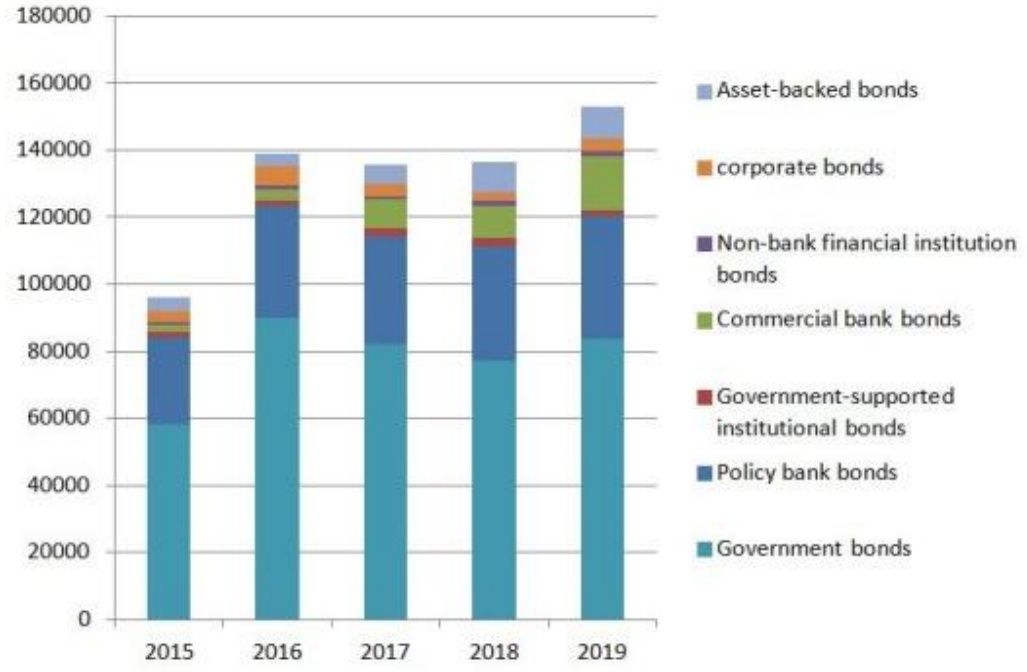
By the end of December 2019, the bond market issuance of China Central Depository & Clearing Co., ltd. has reached CNY 15306.12 billion. This number was CNY 13667.83 billion in 2018, this number was CNY 13579.55 billion in 2017, this number was CNY 13879.02 billion in 2016, and this number was CNY 9603.59 billion in 2015.

[14] Reference: Annex 2

We can calculate that the overall growth rate of Chinese bond market issuance from 2016 to 2019 is 13.75% per annum, relatively stable.

There are many kinds of bonds in the bond market, including government bonds, policy bank bonds, government-supported institutional bonds, commercial bank bonds, non-bank financial institution bonds, corporate bonds, asset-backed bonds.

Graph5.2: Chinese bond issuance



Source: China Central Depository & Clearing Co., Ltd.[15], author

According to the chart, we can see that the issuance in the Chinese bond market is increasing every year, with Policy bank bonds and Commercial bank bonds, as well as Asset-backed bonds, growing more sharply.

5.2 Number of Treasury bonds issued by the two countries

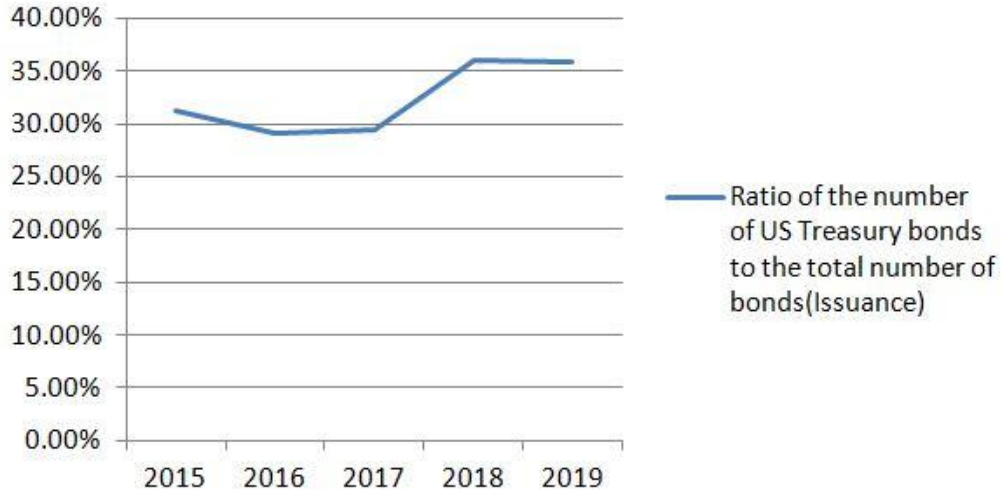
In 2019, the issuance of US Treasury bonds was $ 2935.5 billion, accounting for 35.86% of the total issuance of bonds in the whole year. The issuance of Chinese Treasury bonds was CNY 4009.1 billion, accounting for 26.19% of the total issuance of bonds in the whole year.

In recent years, the proportion of the number of Treasury bonds issued by China and the United States in the total number of bonds is gradually rising. The proportion

[15] Reference: Annex 1

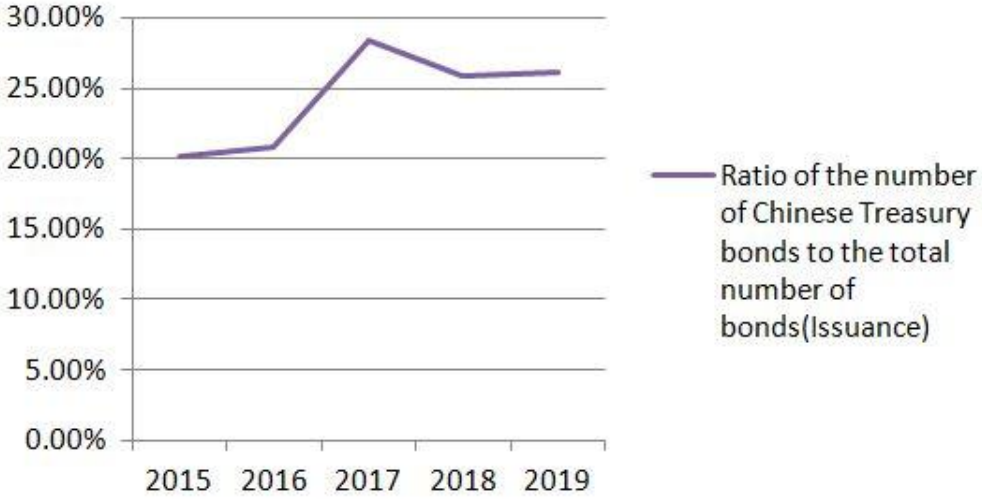
of China's Treasury bonds is floating around 25%, and that of the United States is floating around 33%.

Graph5.3: Ratio of the number of US Treasury bonds to the total number of bonds（Issuance）



Source: Sifma[16], author

Graph5.4: Ratio of the number of Chinese Treasury bonds to the total number of bonds（Issuance）



Source: China Central Depository & Clearing Co., Ltd.[17], author

5.3 Treasury yield curve

The Treasury yield curve is a graph that describes the relationship between the yield to maturity and the maturity of a Treasury bond. On a Treasury yield graph, a

[16] Reference: Annex 2
[17] Reference: Annex 1

curve reflects the level of yield for financial products with different maturities at a certain point in time or over a certain period of time.

5.3.1 Shape of the Treasury bonds yield curve

The vertical axis of the yield curve for Treasuries represents the yield and the horizontal axis is the time to maturity. The yield curve is not static and can change rapidly at any time.

Under normal circumstances, the yield curve rises from left to right, as the longer the term, the higher the yield, reflecting the increase in investment risk as to the term of the investment increases. On the other hand, the inverted yield curve declines from left to right, reflecting the anomaly that short-term yields are higher than long-term yields. An inverted yield curve may reflect, on the one hand, an excess of short-term bonds, which leads to lower prices and higher yields, and, on the other hand, a shortage of long-term bonds or robust investor demand for long-term bonds, which leads to higher prices and lower yields on long-term bonds. Besides, an inverted yield curve can also reflect investors' expectation that long-term inflation will be lower than short-term inflation and that investors' demand for long-term bonds will increase, eventually leading to lower yields.

5.3.2 Relationship between yield curve and economic cycle

In the 1980s, scholars have conducted a great deal of empirical research on the relationship between the angle of the yield curve and economic trends. Overall, the empirical results of most scholars support the assertion that the pattern of the yield curve is a leading indicator of the economic cycle. The relationship between the shape of the yield curve and the economic cycle applies not only to the United States but also to some countries in Europe. As Jana Hvozdenska found in 2015 through an empirical study of the US and 22 European countries, yield curve spreads are significantly better than other financial and macroeconomic indicators in predicting recessions in the next two to six quarters.

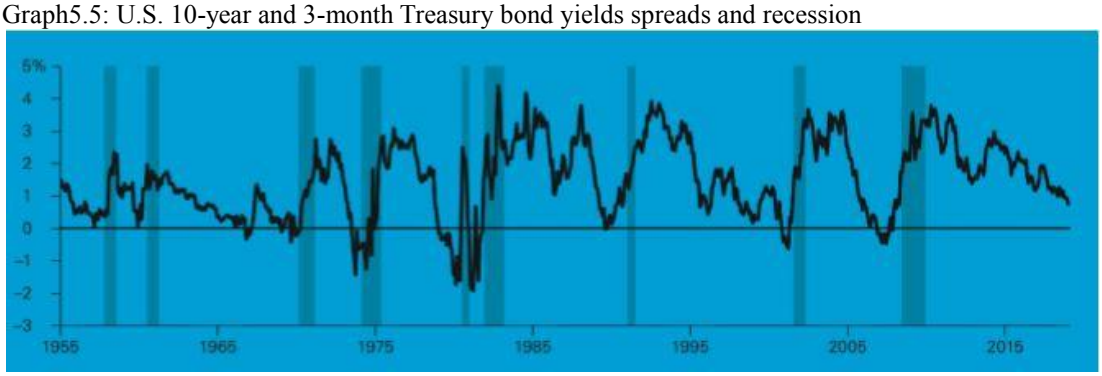
5.3.3 The U.S. Treasury yield curve

This part mainly shows the historical changes of the Treasury yield curve and the changes in 2019.

Historical U.S. Treasury yield curve and economic cycle

Since the late 1960s, the U.S. economy has been in recession without exception whenever the yield on 10-year and three-month U.S. Treasuries has inverted. The National Bureau of Economic Research determines a period of recession when real GDP declines for more than two consecutive quarters.

Graph5.5: U.S. 10-year and 3-month Treasury bond yields spreads and recession



Source: Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/T10Y3M

The spreads in the chart above refer to the monthly average data, with the shaded portion being the U.S. recessionary period.

Since the 1960s, the inversion of 10-year Treasury yields or the narrowing of the gap between 10-year Treasury yields and 3-month Treasury yields have been more reliable signals that the U.S. economy is entering a recession. There are several things analysts and investors need to be aware of when using the yield curve to predict economic trends.

An inversion of the yield curve must occur in substance for it to be a precursor to a recession. An inversion of the yield curve is both a guarantee of the magnitude and duration of the inversion, and a mere narrowing of the spread between long-term bond yields and short-term bond yields, or an occasional negative spread, is not a sign of a recession. For example, the U.S. economy continued to grow strongly for a longer

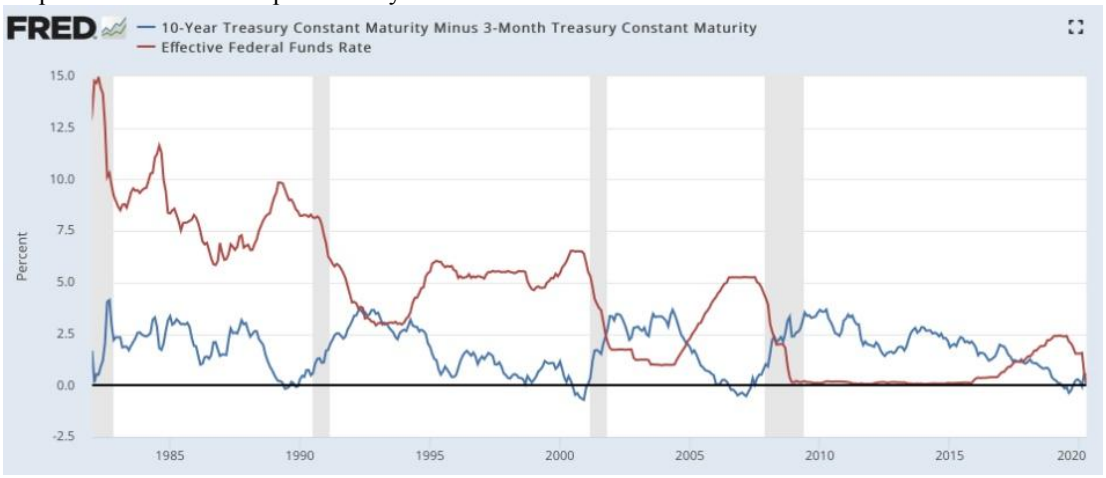
period after the 10-year U.S. bond yield, which was close to collapsing in the 1994-1995 period.

The severity of recessions also varies markedly, with severe ones, such as the 2008 financial crisis, while some recessions are only a brief downturn.

Through data analysis, we find that from the 1980s to the present, most of the upside-down of the yield curve is accompanied by the process of interest rate increase by the Federal Reserve. For example, in the period of economic expansion, when the Federal Reserve gradually increases interest rates, short-term bond yields rise, driven by the interest rate increase, so the yield curve is likely to be inverted.

The Fed has raised interest rates six times since the 1980s. The first time between March 1983 and August 1984, the base rate was raised from 8.5% to 11.5%; the second time between March 1988 and May 1989, the base rate was raised from 6.5% to 9.8125%. The third time, between February 1994 and February 1995, the base rate rose from 3.25 % to 6 %; the fourth time between June 1999 and May 2000, the benchmark rate was raised from 4.75% to 6.5%. The fifth time, between June 2004 and July 2006, the benchmark rate rose from 1% to 5.25%. For the sixth time between December 2015 and December 2018, the benchmark rate rose from 0.5 % to 2.5 %.

Graph5.6: The relationship between yield inversions and effective federal funds rates



Source: Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/T10Y3M

2019 Treasury bonds yield Upside-Down

The spread between the U.S. 10-year Treasury yield and the three-month Treasury yield has been gradually narrowing since 2015, with the spread experiencing a process of first falling and then rising from mid-2015 to January 2017 continuing to fall to a low of -0.52% on August 28, 2019. The upside-down phenomenon continued from May 2019 to October 2019.

Graph5.7: Trends in spreads on 10-year and 3-month Treasury yields from 2015 to present

Source: Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/T10Y3M

The 2019 Treasury yield curve inversion is still in the midst of a Fed rate hike. It is clear from the chart above that since the Fed's first rate hike in late 2015, the spread on U.S. 10-year and 3-month Treasury yields has gradually narrowed until an inversion occurred in 2019.

Trade frictions between China and the U.S. have made investors generally bullish on the U.S. economy in 2019, which has led to lower investor demand for short-term Treasuries, greater demand for long-term Treasuries, and higher prices for long-term Treasuries, which has put greater downward pressure on long-term Treasury yields. The Fed continues to raise interest rates, making investors more willing to save money in the bank, investors' demand for short-term Treasury bonds decreased, the price of short-term Treasury bonds fell, short-term Treasury bond yields continued to rise, further strengthening the phenomenon of the yield curve upside down.

5.3.4 China's Treasury yield curve

This part mainly shows the historical changes and development of the yield curve of China's treasury bonds and the comparison between China and the United States.

The historical Chinese Treasury yield curve

The graph below shows the volatility of the Chinese Treasury bond yield curve between January 1, 2014, and December 31, 2019, the green line represents the Chinese 10-year Treasury bond yield, the orange line represents the Chinese 1-year Treasury bond yield and the red line represents the absolute value of the difference between the two.

Graph5.8: Yield spreads on Chinese 10-year and 1-year Treasuries

Source: China Central Depository & Clearing Co., Ltd. http://yield.chinabond.com.cn/cbweb-mn/yield_main?locale=zh_CN#

As shown in the Graph5.8 above, the yield of China's 10-year government bond has been higher than the yield of the 1-year government bond for the whole five years, and the yield of China's 10-year government bond has been lower than the yield of the 1-year government bond for only ten days in June 2017, averaging about 0.04%. The negative spread between the 10-year and 1-year Chinese bond yields did not last long, and the spread was tiny, so there was no upside-down of the bond yields.

The 1-year and 10-year Treasuries are the key maturity Treasuries of China, and the 3-month and 10-year Treasuries are the key maturity Treasuries of the U.S. We can find that China's Treasuries are more stable and less exposed to external influences by comparing the yield spreads of the key Treasuries of China and the U.S.

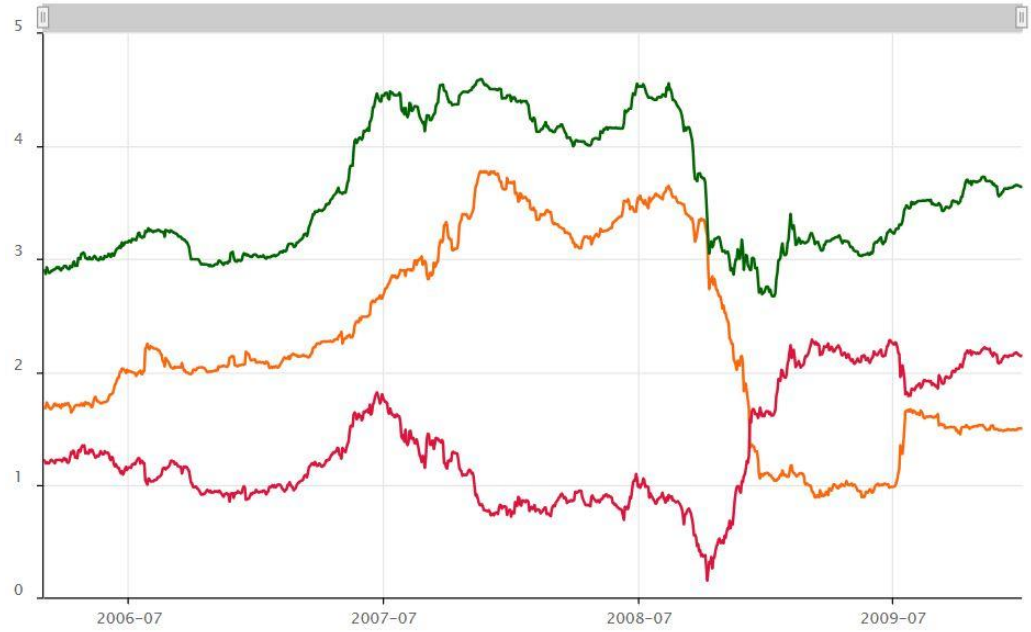
The difference in the yield curves of Chinese and US Treasuries during the financial crisis

Jana Hvozdenska found in 2015, through an empirical study of the US and 22 European countries that yield curve spreads are important in predicting recessions over the next two to six quarters. But China is not included in this report, so it is particularly important to study the relationship between yield curve spreads and economic cycles in China.

We use the 2008 global financial crisis as a backdrop to compare how the Chinese and U.S. Treasury yield curves have changed over this historical economic cycle.

The Graph5.9 below shows the volatility of the Chinese government bond yield curve between March 1, 2006, and December 31, 2009. The green line represents the 10-year Chinese government bond yield, the orange line represents the 1-year Chinese government bond yield, and the red line represents the absolute value of the difference between the two.

Graph5.9: Yield spreads on Chinese 10-year and 1-year Treasuries



Source: China Central Depository & Clearing Co., Ltd.

Graph5.10: Spreads on 10-year and 3-month Treasury yields from early 2005 to late 2009

Source: Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/T10Y3M

The 2008 global financial crisis occurred in late 2007 and early 2009, and we can see from the U.S. Treasury yield spread data that the 10-year and 3-month Treasury yield spreads continued to be negative from July 2006 to March 2007, while the 10-year and 1-year Chinese Treasury yield spreads continued to rise over the same period. In the aftermath of the global financial crisis at the end of 2007, spreads on 10-year and three-month Treasury yields in the United States continued to increase, while spreads on 10-year and one-year Treasury yields in China continued to decrease over the same period. These data suggest that the spreads on Chinese and U.S. Treasury yields showed opposite trends both before and during the financial crisis.

The formation and development of the yield curve of Chinese government bonds

In 1999, China Central Depository & Clearing Co., Ltd. pioneered the first Treasury yield curve in China. In November 2014, China's Ministry of Finance officially released the "China Key Maturity Treasury Yield Curve" for the first time, which mainly includes principal maturities of 1-year, 3-year, 5-year, 7-year, 10-year Treasury bonds, and their yield levels. This initiative is essential for enhancing the transparency of public debt management policies, improving the yield curve of public debt and playing its role as a pricing benchmark, and promoting the sustainable, stable and healthy development of the public debt market.

In June 2016, the People's Bank of China began releasing the Chinese Treasury yield curve, which reflects the yield to maturity for each maturity structure of the Chinese Treasury bond market. The People's Bank of China release of the yield curve for Treasury bonds has raised the level of attention paid to the yield curve by domestic and foreign market players, consolidating the position of Treasury bond yields as China's benchmark interest rate.

China's Ministry of Finance is the issuer of Treasury bonds and the manager of the Treasury bond market, and it has always attached great importance to the development of the Treasury bond market and the construction of the Treasury bond yield curve. In recent years, China's Ministry of Finance is gradually showing an active role in promoting the issuance of Treasury bonds and enhancing liquidity in the spot market of Treasury bonds. The Ministry of Finance has continuously launched bank large depository receipts, pre-issuance of Treasury bonds, Treasury bond futures, and other financial derivatives, all of which have provided favorable conditions for better refining the yield curve of Treasury bonds, such as the 5-year and 10-year Treasury bond futures launched by the Ministry of Finance on September 6, 2013, and March 20, 2015, respectively.

5.4 Yield curve in the context of epidemic situation

In late February 2020, the COVID-19 epidemic accelerated its global spread, and global financial markets were in violent turmoil. On March 9, the U.S. 10-Year Treasury Constant Maturity Rate fell to a low of 0.54% during the epidemic and the

U.S. 30-Year Treasury Constant Maturity Rate also fell to a low of 0.99% during the epidemic on the same day, driven by risk aversion. In contrast, China's epidemic prevention and control situation have continued to improve, the bond market has been operating more smoothly, and the yield curve pattern of bonds has remained basically normal.

5.4.1 U.S. Treasury bond yields during the epidemic

The U.S. 10-Year and 30-Year Treasury Constant Maturity Rate began to decline continuously from February 12, 2020, March 9, the epidemic and falling oil prices hit the financial market, the U.S. stock market appeared the second meltdown in history, the U.S. 10-Year and 30-Year Treasury Constant Maturity Rate fell to 0.54% and 0.99%, respectively. On March 12, the European and American stock markets plunged again, causing panic among investors, who had to sell all kinds of assets in order to stop losses in time, and the yield of U.S. Treasury bonds rose slightly. On March 15, the Federal Reserve announced a cut in the federal funds rate target range of 100 basis points, opening up the scale of quantitative easing monetary policy up to $700 billion. As of April 30, the overall U.S. Treasury yield curve has moved down 100 to 150 basis points from before the outbreak.

Graph5.11: U.S. Treasury yields on four maturities during the epidemic

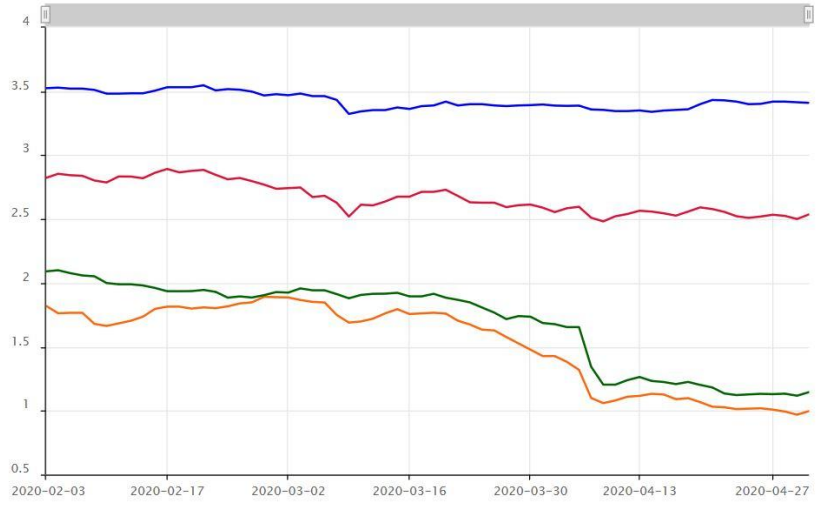
Source: Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/T10Y3M

5.4.2 Chinese government bond yields during the epidemic

Compared with the U.S. market, the Chinese bond market operated more smoothly during the epidemic, with the yield curve of Treasury bonds moving

steadily downward, without any significant shocks in yields. On February 20, 2020, the 1-year Loan Prime Rate was 4.05%, down ten basis points from the previous period; the Loan Prime Rate for more than five years was 4.75%, down five basis points from the previous period. On March 16, the Central Bank of China implemented a targeted reduction in the deposit reserve rate, reducing the deposit reserve rate for banks that meet the requirements by 0.5 to 1 %age point. In early April, the Bank of China announced a targeted reduction in the deposit reserve rate for small and medium-sized banks and reduced the excess deposit reserve rate for financial institutions at the central bank to 0.35%. On April 20, the 1-year Loan Prime Rate and the 5-year+ Loan Prime Rate dropped 20 basis points and ten basis points, respectively, from the previous period, leading to a continued decline in Treasury yields. As of April 30, the Chinese government bond yield curve had moved roughly 40 to 100 basis points lower than before the outbreak.

Graph5.12: Chinese Treasury yields on four maturities during the epidemic



Colour	Curve Name	Date	Yield(%)
■	ChinaBond Government Bond Yield Curve(YTM)(6m)	2020-02-03	1.8217
■	ChinaBond Government Bond Yield Curve(YTM)(1y)	2020-02-03	2.091
■	ChinaBond Government Bond Yield Curve(YTM)(10y)	2020-02-03	2.8231
■	ChinaBond Government Bond Yield Curve(YTM)(50y)	2020-02-03	3.525

Source: China Central Depository & Clearing Co., Ltd. http://yield.chinabond.com.cn/cbweb-mn/yield_main?locale=zh_CN#

5.4.3 Differences in the Chinese and American securities market during the epidemic

This part mainly analyzes the reasons for the different changes in the bond market between China and the United States during the epidemic.

Differences in macroeconomic and financial situation

Since the outbreak of the epidemic, the Chinese Government has acted swiftly to control the epidemic in a timely and effective manner, while the effectiveness of global epidemic prevention and control varies greatly. China is ahead of the other major economies and has taken the lead in a smooth economic recovery. From the perspective of financial markets, the United States is already facing a serious problem of asset price bubbles and debt leverage. In the event of an external shock, investor panic grows, and investors continue to sell off risk assets. In contrast, China's bond and stock markets have operated more robustly during the epidemic.

Different tools of monetary policy

The monetary policy instruments commonly used by the Chinese central bank are quantitative monetary policy instruments. Lowering the deposit reserve ratio is one of the quantitative monetary policy instruments that can have a policy effect similar to a rate cut by providing excess liquidity to the market to guide market interest rates down.

When the U.S. federal funds rate is above zero, the U.S. primarily uses price-based monetary policy instruments for regulation, such as adjusting the U.S. federal funds rate target range and the excess reserve ratio, while quantitative easing, an unconventional monetary policy, is generally only activated when the rate reaches the lower bound of zero. The level of short-term U.S. Treasury yields can directly reflect the market's monetary policy expectations for the Federal Reserve. When short-term U.S. Treasury yields are significantly below the federal funds target rate, the Federal Reserve is likely to take interest rate reduction action, with short-term U.S. Treasury yields remaining below the federal funds target rate from January to March 2020. The Fed lowered its target range for the federal funds rate to 0 to 0.25% on March 15.

Different monetary policy objectives in China and the United States

After the international financial crisis in 2008, the Federal Reserve carried out a large-scale quantitative easing monetary policy, but the economic growth rate remained at a low level. The Federal Reserve has substantially increased financial asset prices and leverage through unconventional monetary policy. In March 2020,

the Fed implemented a rate cut, and on March 16, U.S. stocks opened plummeting, triggering a third meltdown in the month and further deteriorating market confidence. After the Fed cut rates, a number of central banks around the world implemented lower rates or more accommodative monetary policy in the following two weeks. However, China's central bank did not immediately implement the rate cut and combined with China's domestic economic situation, and it did not cut the Medium-term Lending Facility Rate until April 15.

5.5 Comparison of Chinese and American Treasury bond markets

In 1981, the issuance of Chinese government bonds resumed, and in 1988, they were put into circulation and transferred, and the Chinese government bond market entered a period of rapid development. However, there is still a gap in China's Treasury bond market compared to mature markets such as Europe and America.

5.5.1 Imbalance of China's securities issuance mechanism

Under China's current system, the primary market mechanism for issuing China's Treasury bonds is the underwriting system, in which tenders are issued on the basis of the Treasury bond underwriting group. Bidding is limited to members of the syndicate, and members not in the syndicate are not allowed to participate in the bidding and issuance of the bonds. Developed countries in Europe and the United States generally issue bonds through public tenders, and a wide range of types and numbers of subjects can participate in the bidding. For example, the United States adopts the issuance of public tenders, all institutions and individual investors can participate in the bidding, and individual investors only need to pay a certain commission fee to the agent, can entrust the Treasury bond self-dealer agent to participate in the bidding, so as to ensure that the main body of the bidding is fully competitive. This type of public bidding makes the U.S. Treasury bond primary market more competitive and transparent.

China's Ministry of Finance has imposed more stringent requirements on the qualification of the main body of Treasury bond issuance, restricting most market participants, which is not conducive to enhancing the competitiveness and participation of the primary market for Treasury bonds. To some extent, it also leads

to a low proportion of China's Treasury bonds issuance in the total amount of bond issuance.

In terms of interest rate formation mechanism, the issue of Chinese government bonds pays more attention to fiscal policy and the cost of issuing bonds, and lacks the coordination with monetary policy. As a result, the current yield curve of Chinese government bonds is not enough to provide an effective interest rate benchmark for pricing all financial products. Bank deposits on a regular basis, for example, bond yields as the cost of issuing debt should be lower than deposit rates, but the market practice due to the Treasury bonds issuing mechanism ossified, the participation is not rich enough, its interest rates tend to be higher than the same term deposit rates, this undoubtedly increased the pressure of debt servicing, at the same time also cannot accurately reflect supply and demand of funds, making it difficult to give full play to their role as the pricing benchmark government bond yield curve.[18]

5.5.2 Imbalance of secondary market structure of China

The issuing entities in the primary market and the trading entities in the secondary market of Chinese government bonds are mainly state-owned Banks with strong market monopoly. Take the secondary market as an example. By the end of 2019, the proportion of commercial Banks' Treasury bonds held in total was as high as 64.99%.[19]

In 2019, American banks accounted for 5.39 % of the total Treasury holdings, while foreign governments and international financial institutions accounted for 35.32 % of the total Treasury holdings.[20]

In recent years, despite the gradual liberalization of access thresholds to China's Treasury bond market, it is still dominated by banking-type financial institutions, which has led to the coverage of the entire Treasury bond market being significantly less than that of the United States and not reflect the real needs of the Treasury bond market.

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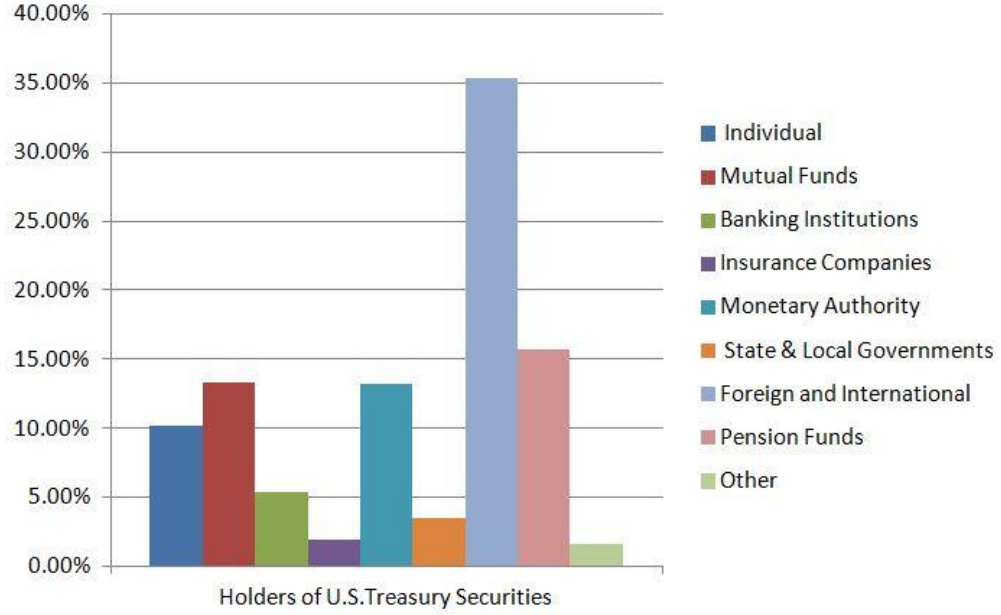
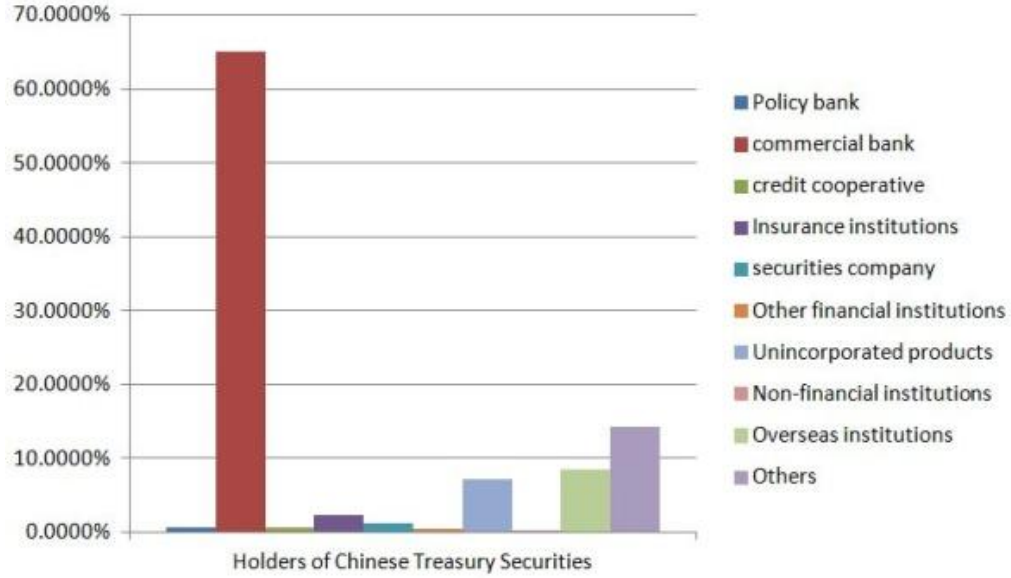
[18] Source: source: Guo tao, song deyong. *Monetary policy implications of the term structure of interest rates in China* [J]. Economic research, 2008 (3): 39-47. ISSN：0577-9154.
[19] Reference: China Central Depository & Clearing Co., Ltd.*2019 bond market statistical analysis report.* P15. https://www.chinabond.com.cn/cb/cn/yjfx/zzfx/nb/20200117/153611773.shtml
[20] Reference: Annex 3

Graph5.13: Holders of U.S.Treasury Securities



Source: Sfima[21], author

Graph5.14: Holders of Chinese Treasury Securities



Source: China Central Depository & Clearing Co., Ltd.[22], author

The participation structure of U.S. Treasury bonds is highly open, with a wide range of participants, including Individual, Mutual Funds, Monetary Authority, overseas governments, and international financial institutions, as well as Pension Funds. From the perspective of holding structure distribution, the majority of

[21] Reference: Annex 3
[22] Reference: China Central Depository & Clearing Co., Ltd.*2019 bond market statistical analysis report.* P15. https://www.chinabond.com.cn/cb/cn/yjfx/zzfx/nb/20200117/153611773.shtml

investors are institutional investors, while the proportion of individual investors is relatively low. The vast majority of us Treasury bonds are completed through the otc market. The free trading mode brings an active atmosphere and good liquidity to the market, while the widespread application of the electronic trading system further improves the market trading efficiency.

As can be seen from the composition chart of holders of Chinese government bonds, the largest holders of Chinese government bonds are commercial Banks. The participation structure of Chinese government bonds is not open, and the main participants of Chinese government bonds are concentrated.

At present, the secondary market of Chinese government bonds mainly includes the inter-bank bond market, the exchange market and the over-the-counter market. Among them, the interbank bond market is the largest, accounting for about 90% of the Treasury bond market[23], with distinct liquidity advantages. Exchanges and over-the-counter markets are relatively small. Although each market has its advantages, it is regulated by different regulators and governed by different laws and regulations. Under this kind of market segmentation, the participants of different markets also have significant differences. Participants in the over-the-counter market are primarily non-financial corporations and individual investors. The participants of the counter market are mainly non-financial enterprises and individual investors.

Treasury market participation main body and the structural imbalance, less long-term Treasury bonds in the secondary market is in a state of division, regulators number, reduces the liquidity of bonds, these problems lead to bond yields chaos, cannot really reflect the capital supply and demand, affect the Treasury bonds is issued primary, secondary circulation process of marketization, hindered the development of China's bond market.

5.5.3 Lack of liquidity in the secondary market of China

Under China's current tax system, interest income from Treasury bonds held by Chinese companies and individuals is exempt. This policy has played an essential role in increasing investors' incentive to buy Treasuries and promoting their issuance over

[23] Source: China Central Depository & Clearing Co., Ltd.*2019 bond market statistical analysis report.* https://www.chinabond.com.cn/cb/cn/yjfx/zzfx/nb/20200117/153611773.shtml

a considerable period. However, with the continuous reform of China's financial system, the tax-exempt policy of interest income from Treasury bonds is no longer suitable for the current market-oriented financial environment.

For the purpose of promoting the development of Treasury bonds markets, most developed countries, such as the United States, no longer include interest income from Treasury bonds as a tax-free item. U.S. securities laws exempt interest on savings bonds from state and local taxes, but not from federal taxes. The U.S. Treasury bond market selects underwriters among market makers to ensure the liquidity of the Treasury bond market. One has to be a market maker before one can be an underwriter of Treasury bonds.

The developed countries such as the United States and other developed countries also have the problem of weak secondary market liquidity in the early stage of development, and the market maker system has dramatically improved the liquidity of the secondary market. Drawing on the experience of developed countries such as the United States, in 2007, the People's Bank of China issued the "Regulations on the Management of Market Maker in the National Interbank Bond Market", marking the formal establishment of the Chinese market maker system.

5.6 Comparison of Chinese and American local government bond markets

This section will compare the local government bonds of China and the United States in detail.

5.6.1 Financial relations between central and local governments

The U.S. government includes federal, state, and local governments. The federal government is mainly responsible for the supply of national public services, while the state and local governments are responsible for the supply of regional public services. Governments at all levels have relatively independent tax systems. The federal government's main tax is the individual income tax, the state is the sales tax, and the local government is the property tax.

Local governments are only responsible for local finances, and the federal government has few restrictions on the issuance of debt by local governments, but there are strict rules at the legal level regarding the amount of debt and the use of the debt. Local governments can be financed through the issuance of municipal bonds, which are only subject to council approval or public vote of approval and do not need to be reported to the federal government for approval. The federal government issues bonds primarily in relation to the country's macroeconomic policies, while local governments issue bonds primarily to build infrastructure and provide corresponding public services.

China has a relatively homogeneous government structure, with local governments being subordinate to the central government. China's basic fiscal system does not allow local government finances to have borrowed. When local governments ceded fiscal authority to the central government after the 1994 tax reform, their fiscal spending responsibilities were not relatively reduced. This initiative has increased the central government's macro-control capacity but has exacerbated the contradictions in local government revenues and expenditures. Bypassing legal constraints, local governments have led the way in setting up various financing platforms and have issued local government bonds through indirect issuance. In particular, after the 2008 financial crisis, a large number of local governments borrowed illegally, and after 2014, the central government introduced a series of remedial measures to enforce permanent liability for illegal borrowing and to carry out a debt replacement model, making the debt gradually become apparent.

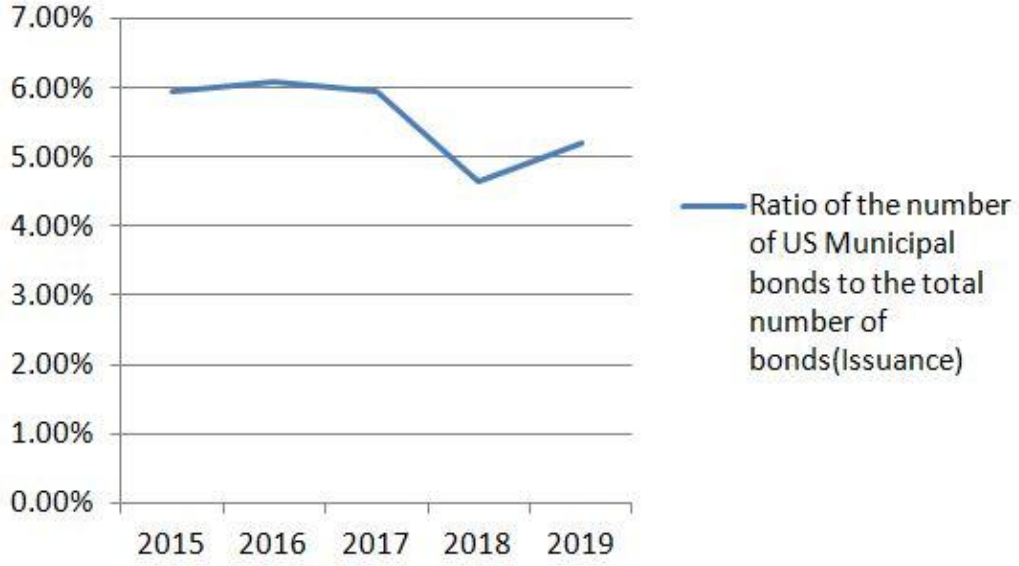
China's central government does not allow local governments to go bankrupt, and in the event of a financial crisis in a local government, the central finance ministry needs to manage the local government's financial activities thoroughly. In order to prevent local governments from borrowing on their own and causing a series of risks, the central government has banned local governments from issuing bonds at the institutional level. After the introduction of the new regulations on local government bonds in 2014, the central government allowed some provincial governments to issue bonds moderately. However, municipal governments and other grass-roots governments could not issue bonds independently, which made local governments still lack independence in issuing bonds.

5.6.2 Size of local government bonds

China's Ministry of Finance, introduced on January 12, 2016, clearly stated in the new regulations that the State Council determines the total limit of local government debt based on the macroeconomic situation and other factors, and that the new regulations constrain the financing behavior of financial institutions and the government's guarantee behavior to control the size of the debt. However, both of these aspects lack detailed quantifiable indicators. The United States has a long history of bonding, and local governments have developed a relatively well-developed system of indicators for the size and amount of their debt.

In 2019, the issuance of US Municipal bonds was $ 425.9 billion, accounting for 5.2% of the total issuance of bonds in the whole year. The issuance of Chinese Municipal bonds was CNY 4362.43 billion, accounting for 28.50% of the total issuance of bonds in the whole year.

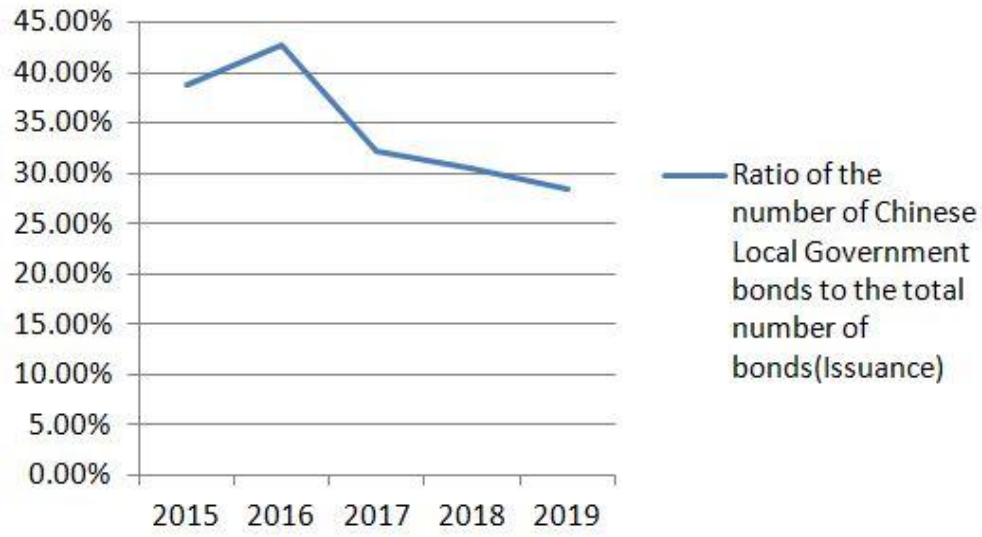
Graph5.15: Ratio of the number of US Municipal bonds to the total number of bonds



Source: Sifma[24], author

[24] Reference: Annex 2

Graph5.16: Ratio of the number of Chinese Local Government bonds to the total number of bonds



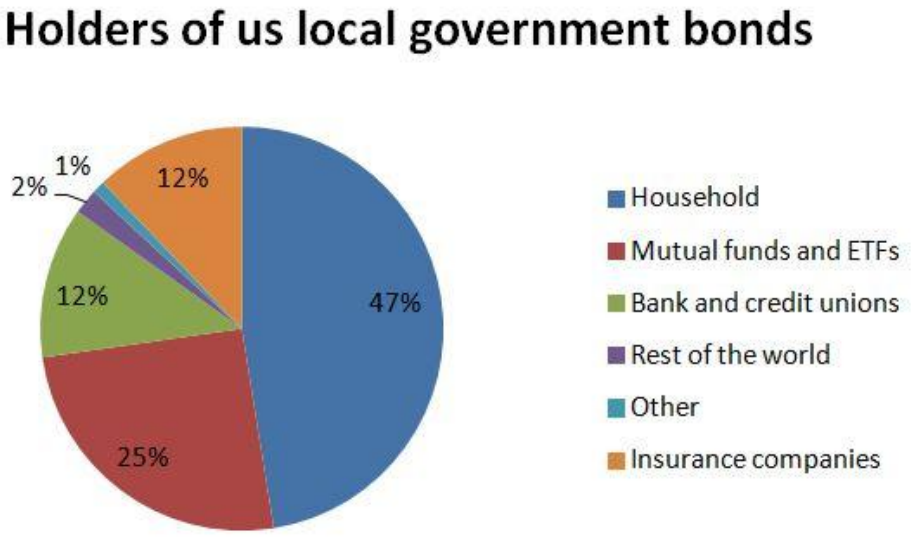
Source: China Central Depository & Clearing Co., Ltd.[25], author

The proportion of local government bonds issued by China to total bonds is much higher than that of the United States. In recent years, the proportion of local government bonds issued by China to total bonds has gradually declined, from more than 40% to less than 30%, while that of the United States has remained stable between 4.5% and 6%.

[25] Reference: Annex 1

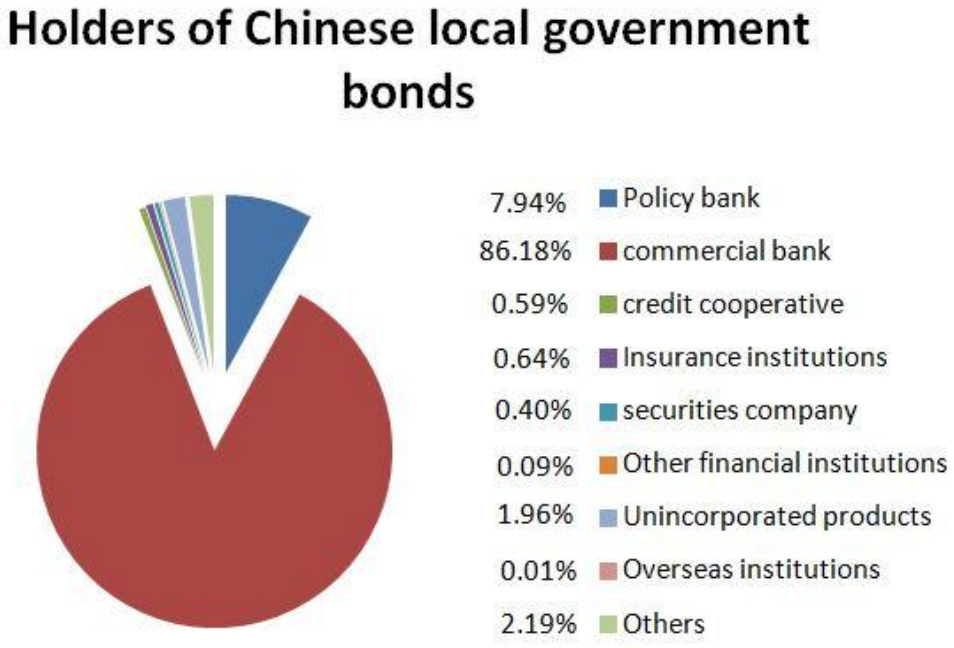
5.6.3 Holders of local government bonds

Graph5.17: Holders of US local government bonds



Source: Invesco, author

Graph5.18: Holders of Chinese local government bonds



Source: China Central Depository & Clearing Co., Ltd, author

Looking at the structure of local government bondholders in the two countries, we can see that local government bondholders in the United States are more evenly split, with the largest holder being Household, holding 47% of local government

bonds, and the smallest holder being Others, holding 1% of local government bonds. The structure of local government bondholders in China is very uneven, with the largest holder being commercial banks, holding 86.18% of local government bonds, and the smallest holder being Overseas institutions, holding 0.01% of local government bonds, with the exception of commercial bank and policy bank, the other six bondholders holding less than 2.19%.

5.6.4 Comparison of financing methods between the United States and China

Local governments across China are similar to the United States in terms of the huge demand for financing infrastructure construction, which requires long-term financing. While local governments in the United States mainly use capital market financing, in China, bank financing is the mainstay. U.S. municipal bonds are typically issued by investment or commercial banks to help the government, while Chinese local government bonds are primarily issued by Treasury Department agents or are self-issued.

China's financing platform has many problems. The central government has difficulty controlling the scale of local government debt, the cost of financing is high, the financing process is not transparent, and there are moral risks. Similar to China's financing platform, a special type of institution exists in the United States and other countries, often with a particular purpose and often with special methods of hiding debt. The U.S. has mainly avoided this risk by improving its accounting system, but Chinese regulators do not yet have a solution.

5.6.5 Debt risk of two countries

Local governments issue bonds that are primarily secured by government credit, so the higher the government credit, the lower the bond interest rate and the less risky the investment. Local governments in China choose one of the local credit rating agencies to publish the credit rating of the bonds, which can lead to the problem of over-rating by the rating agencies, and the results of the ratings of the individual local bonds are the highest credit rating, so the rating results are not authentic.

The ability of local governments in the United States to effectively issue municipal bonds and absorb large amounts of private capital for investment in urban

infrastructure is entirely dependent on their well-developed securities markets and financing environment. A well-developed information disclosure system avoids information asymmetry, and timely updated information gives investors more autonomy in their choices. Third-party international credit rating agencies such as Standard & Poor's and Moody's rate municipal bonds, allowing investors to understand their repayment capacity and risk. By working with the bond market, insurance agencies can reduce the risk of possible defaults during the bond issuance process.

State and local government debt exposures in the United States mainly include the diversion of borrowing by some local governments, for example, by borrowing to cover fiscal deficits, by borrowing to pay pensions, and by some local governments to pay off short-term debt with long-term debt. Some of these practices go against the law or accounting rules, some state legislatures have questionable loan approval processes, and politicians interfere with bond issues for political purposes.

Moody's Investors Service credit-rates U.S. municipal bonds, which are divided into seven major components, Aaa, Aa, A, Baa, Ba, B, Caa-C, which are sequentially riskier and have an increased probability of occurrence.

Graph5.19: Average Cumulative Default Rates of Municipal Bonds

Municipal Default Rates Lower than Global Corporates for All Broad Categories
Average Cumulative Default Rates, 1970-2018, Municipals vs. Global Corporates

Municipals

Rating	Average Cohort Count	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Aaa	1,008	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Aa	6,981	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%
A	4,877	0.00%	0.01%	0.02%	0.03%	0.03%	0.04%	0.06%	0.08%	0.09%	0.11%
Baa	672	0.03%	0.11%	0.22%	0.35%	0.48%	0.63%	0.76%	0.89%	1.02%	1.13%
Ba	111	0.25%	0.69%	1.12%	1.62%	2.03%	2.34%	2.71%	3.06%	3.38%	3.65%
B	23	2.84%	5.63%	8.31%	10.41%	12.52%	14.04%	15.09%	15.85%	16.71%	17.91%
Caa-C	11	9.20%	14.42%	17.79%	19.65%	20.90%	22.17%	23.12%	24.15%	25.14%	25.75%
Investment-Grade	13,538	0.00%	0.01%	0.02%	0.03%	0.04%	0.05%	0.06%	0.08%	0.09%	0.10%
Speculative-Grade	145	1.32%	2.47%	3.47%	4.31%	5.05%	5.62%	6.13%	6.59%	7.03%	7.47%
All Rated	13,683	0.02%	0.04%	0.05%	0.07%	0.09%	0.10%	0.12%	0.14%	0.15%	0.16%

Global Corporates

Rating	Average Cohort Count	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Aaa	105	0.00%	0.01%	0.01%	0.03%	0.08%	0.13%	0.19%	0.24%	0.30%	0.37%
Aa	414	0.02%	0.06%	0.11%	0.19%	0.29%	0.39%	0.51%	0.61%	0.70%	0.78%
A	869	0.05%	0.15%	0.32%	0.50%	0.72%	0.96%	1.22%	1.50%	1.80%	2.10%
Baa	827	0.16%	0.43%	0.75%	1.13%	1.52%	1.93%	2.33%	2.74%	3.20%	3.70%
Ba	455	0.89%	2.44%	4.23%	6.13%	7.91%	9.55%	11.03%	12.47%	13.95%	15.48%
B	553	3.33%	7.87%	12.54%	16.80%	20.66%	24.11%	27.19%	29.84%	32.24%	34.28%
Caa-C	315	10.03%	17.59%	24.00%	29.42%	34.02%	37.63%	40.78%	43.71%	46.34%	48.23%
Investment-Grade	2,215	0.09%	0.23%	0.42%	0.65%	0.89%	1.15%	1.41%	1.69%	1.98%	2.28%
Speculative-Grade	1,322	4.03%	8.11%	11.98%	15.43%	18.43%	21.01%	23.25%	25.25%	27.11%	28.79%
All Rated	3,537	1.53%	3.04%	4.42%	5.62%	6.64%	7.51%	8.26%	8.92%	9.55%	10.13%

1. Average CDRs are computed by averaging cohort CDRs for cohorts formed every month starting from January 1, 1970.
2. Historical ratings have been adjusted to be consistent with the Global Rating Scale as described in Appendix G.
Source: Moody's Investors Service

Source: Moody's Investors Service. *U.S. Municipal Bond Defaults and Recoveries,1970-2018*,P.8.

Some local governments in China are at high risk of defaulting on their debts and are currently entering a peak period of debt service, estimated to be from 2020 to 2024. The average annual repayment amount is about 270 billion CNY. Local government debt ratio is equal to the local government debt balance divided by GDP, China's Guizhou, Qinghai, Hainan and other provinces with relatively high debt risk, the end of 2018 Qinghai province debt ratio high as 61.5%, up 3.5 %age points from 2017. In second place is Guizhou Province, which had a high debt ratio of 59.7 % at the end of 2018. The two provinces lack new economic growth points, are slow to transform, have the insufficient fiscal capacity and are at higher risk. With the exception of these two provinces, the remaining provinces have debt ratios below 40 %.[26]

Economically developed regions have large debt but also large GDP, so the debt ratio is low. Economically underdeveloped regions have large debts, small aggregate GDP, and high debt ratios. High debt ratios indicate that the debt service capacity of

[26] Source: The 21st Century Business Herald. *2019 China financial report: government debt risk and solution.* https://m.21jingji.com/article/20200121/herald/34ecc9f080d830774ef2702e17bacb0d.html

regional governments is low over a certain period, limiting their ability to raise debt and raising financing costs.

5.6.6 Local government bond default mechanisms and debt regulation in Central America

Local government bonds in the United States have a very rich regulatory mechanism.

Local government debt regulation in the United States

United States legislatures at all levels have passed laws regulating local government borrowing and lending activities: borrowing can only be used for long-term investments in public assets and generally not for day-to-day government expenditures. Require local governments to make medium-term budgets, such as three to five-year budgets. Local governments make the budget process public and transparent, conduct public audits of financial accounts, and regularly publish information on financial obligations.

US Local Government Bond Default Facility

Insolvency mechanisms are post-debt default resolution procedures that protect the interests of creditors while maintaining the government's essential public services. Insolvency mechanisms are mainly judicial and administrative in nature. The insolvency mechanism is a protection mechanism for the disposal of insolvent local governments and for all persons involved in the event of insolvency of the local government. In the United States, sub-state local governments are protected by the insolvency regime, but state governments are not protected by the insolvency regime.

The judicial approach may exclude political interference, and the courts may provide reorganization procedures. The administrative approach allows the higher government to take direct control of the local government and temporary control of the local government's finances.

Lack of supervision of local government bonds in China

At present, the construction of the regulatory system of local government debt in China is still very imperfect, and local governments use financing platforms as an important financing method, making it difficult to carry out effective regulation of local government debt due to lack of transparency. Financing platforms conceal the true picture of local debt, resulting in a lack of accurate statistics and valid disclosure of local debt.

5.6.7 Some problems with local government bonds in China

At present, there are still many problems in China's local government bonds.

The large size of the hidden debt of local governments

The International Monetary Fund reported that China's local government implicit debt is around CNY 309 billion, which is comparable in size to explicit government debt, and the total leverage ratio of Chinese government departments with implicit local government debt in 2018 was 71.6%. According to the International Monetary Fund, the growth rate of local government implicit debt will decline by 9.1% in 2024, the growth rate of total government debt including implicit debt will fall to 10.2%, and the total debt of the Chinese government will reach 142,700 billion CNY in 2024. [27]

Weak rights of local government

From banning local governments from issuing bonds to moderate bond issuance by provincial governments, China's authority to issue bonds has been gradually amplified, but low-level local governments do not have the right to issue bonds, and the basic work of urban infrastructure construction is still done by low-level governments. The over-concentration of the Chinese government's right to issue bonds has reduced the autonomy of lower-level local governments and has kept many infrastructure construction projects at a standstill.

[27] Source: International Monetary Fund, Institute of Economic Chinese Academy of Social Sciences

Inadequate local government bond rating system

Compared to the introduction of international rating agencies in the United States, China's credit rating agencies for local government bonds lack credibility internationally. Rating results are unfair and information asymmetries are high and do not attract global investors

Single investor of local government bonds

Local government bonds in China are mainly financed by financial institutions such as banks, with a very small share of individuals and overseas investors, and only a very small part of the country has liabilities to banks in other countries. The inability of individual investors to invest in local government bonds, where individual investors are recipients of social benefits, has led to the suspension of many plans for infrastructure construction because local governments are unable to issue bonds. The process is a circular one and local governments should increase their ability to attract private capital.

Inefficient local government bonds

The United States has a local bond administration, independent of the Treasury, which manages local government debt. And local government bonds in China have been managed in a multi-sectoral manner, lacking effective oversight. China's local government debt management agencies are high-level departments that are unable to fully engage and participate in low-level government debt management, and their management is mostly sham and inefficient.

5.7 Final Summary

Over the past five years, the number of Treasury bonds issued by the two countries has been gradually increasing, with China's Treasury bond issuance accounting for about 25 % of the total and the United States' Treasury bond issuance accounting for about 33 % of the total. China has a relatively homogeneous structure of Treasury bondholders, with commercial banks holding as much as 64.99% of Treasury bonds at the end of 2019. Moreover, foreign governments and international financial institutions are the investors who hold the enormous amount of U.S.

Treasuries, with 35.32% of their holdings. In recent years, China has continued to liberalize access to the Treasury bond market, but it is still dominated by banking-type financial institutions, resulting in a significantly lower coverage of the entire Treasury bond market than the United States. Low bond liquidity has hampered the growth of China's Treasury bonds.

The occasional inversion of the Treasury yield curve in the United States has not yet occurred in China. Experts see the inverted yield curve as a sign of a recession in the US. However, it is not a sign of a recession in China just yet, because the yield curve on Chinese Treasuries was not abnormal before the global financial crisis. By comparing the trend of the Treasury yield curve at the time of the 2008 financial crisis, we can see that the spreads between Chinese and US Treasury yields have shown opposite trends before and during the financial crisis. The impact of the epidemic on the economy was fatal, with the yield curve falling in both countries during the epidemic.

Over the past five years, the number of local government bonds in China as a percentage of total bonds has gradually declined, from above 40 percent to below 30 percent, while in the United States it has remained stable at between 4.5 and 6 percent. The holder structure of local government bonds is the same as that of central government bonds. The U.S. is more evenly structured, while China's holders are very homogeneous. The largest holder of local government bonds in China in 2019 was a commercial bank, which held 86.18% of local government bonds, while the largest holder in the U.S. was an individual, holding 47% of local government bonds.

The United States has introduced third-party rating agencies to provide fair ratings for each municipal bond, such as Moody's. China has not yet introduced a third-party rating agency.

The U.S. government bond market is much more mature than China, and China is also reforming. More institutions will hold Chinese central government bonds in the future, and the market will gradually open. At the same time, there will be more investment institutions and individuals to invest in local government bonds, and commercial banks will continue to reduce the ownership of government bonds. China

should speed up the introduction of third-party rating agencies to rate some local government bonds and expand the attention of foreign investors.

6 Conclusion

The purpose of this paper is to let us know the current situation of the Government bond of the two countries, as well as their advantages and disadvantages by comparing the data of the Government bond of China and the United States.

By comparing the structure of government bondholders of the two countries, we find that China's structure is unreasonable and unbalanced. The number of bonds held by commercial banks is too large, and the market needs more institutions and individuals to participate.

By studying the yield curve of the two countries, we find that the upside down yield curve is a sign of US economic recession, but there is no similar conclusion in China. The Treasury yield curve is important because it gives investors confidence and reflects their expectations for the future.

A third-party international rating agency cooperates with the United States to rate its municipal bonds, and China has not yet cooperated with such a rating agency. There is no fair rating of third-party institutions, local government bonds in China are not attractive to investors, and China should cooperate with third-party institutions.

The yield curve for Chinese and U.S. Treasuries fell overall during the epidemic. This shows that the impact of the epidemic on the economy is huge. Every country should actively fight against the epidemic and revive the economy.

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List of Abbreviations

T-Bills	Treasury Bills
T-Notes	Treasury Notes
T-Bonds	Treasury Bonds
USD	United States dollar
CNY	Chinese Yuan
U.S.	United States of America

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List of Annexes

Annex 1

China's bond issuance from 2015 to 2019(CNY Billions)

	2019	2018	2017	2016	2015
total bond	15,306.12	13,667.83	13,579.55	14,143.87	9,873.45
government bond	8,371.53	7,706.27	8,224.27	8,991.61	5,822.60
local government bond	4,362.43	4,165.17	4,358.09	6,045.84	3,835.06

Source: China Central Depository & Clearing Co., Ltd.

Annex 2

Issuance in the U.S. Bond Markets（USD Billions）

Year	Municipal	Treasury	Mortgage-Related	Corporate Debt	Federal Agency Securities	Asset-Backed	Total
1996	182.9	652.7	551.8	337.4	277.9	121.2	2,123.8
1997	218.6	565.2	725.2	455.3	323.1	143.1	2,430.6
1998	284.1	485.6	1,261.7	588.5	596.4	184.2	3,400.5
1999	224.6	416.1	1,122.0	602.1	548.0	196.3	3,109.2
2000	198.2	312.6	779.9	575.1	446.6	240.3	2,552.6
2001	286.5	380.6	1,818.5	770.6	941.0	261.4	4,458.6
2002	356.6	572.2	2,514.9	635.4	1,041.5	268.6	5,389.2
2003	380.3	745.2	3,537.2	773.8	1,219.5	287.6	6,943.4
2004	358.1	853.4	2,428.7	775.8	877.8	330.6	5,624.3
2005	407.1	746.1	2,764.7	750.8	635.0	473.7	5,777.5
2006	387.9	788.5	2,691.1	1,058.3	691.8	658.2	6,275.9
2007	429.2	752.2	2,434.6	1,139.0	831.2	795.9	6,382.1
2008	389.3	1,029.4	1,394.0	712.7	924.8	215.2	4,665.5
2009	409.6	2,197.2	2,172.1	941.7	1,244.4	177.9	7,142.9
2010	433.3	2,319.8	2,012.6	1,053.3	1,362.1	125.9	7,307.0
2011	295.1	2,103.3	1,724.8	1,022.9	1,025.3	151.0	6,322.4
2012	382.7	2,304.6	2,195.1	1,368.9	925.5	259.0	7,435.8
2013	335.4	2,140.0	2,120.2	1,376.6	652.9	304.1	6,929.2
2014	339.1	2,215.2	1,439.6	1,435.4	558.7	393.4	6,381.4
2015	405.1	2,122.4	1,800.7	1,490.7	645.5	333.4	6,797.8
2016	451.9	2,169.4	2,044.2	1,519.1	927.9	325.4	7,438.0
2017	449.0	2,224.3	1,934.7	1,642.2	731.3	550.3	7,531.9
2018	346.1	2,684.7	1,905.8	1,333.1	653.6	516.9	7,440.2
2019	425.9	2,935.5	2,109.9	1,415.3	989.4	310.2	8,186.1

Source: Sifma

Annex 3

Holders of U.S. Treasury Securities(USD Billions)

	Individuals[2]	Mutual Funds[3]	Banking Institutions[4]	Insurance Companies[5]	Monetary Authority	State & Local Governments	Foreign and International
1996	888.0	218.1	203.1	218.9	390.9	259.1	1,121.0
1997	806.1	227.6	200.3	183.3	430.7	241.1	1,248.3
1998	774.0	241.6	168.5	150.6	452.1	285.7	1,251.0
1999	699.7	215.4	111.7	128.4	478.0	310.5	1,152.9
2000	535.8	214.5	104.3	119.4	511.7	316.9	1,115.5
2001	405.4	255.6	87.6	120.6	551.7	336.4	1,199.0
2002	310.7	274.2	102.3	170.8	629.4	363.6	1,402.2
2003	383.1	275.1	158.0	172.9	666.7	384.3	1,546.9
2004	409.0	268.4	53.2	195.4	717.8	408.6	1,841.3
2005	283.2	279.4	25.0	209.2	744.2	538.4	2,012.2
2006	181.5	278.4	21.3	202.0	778.9	600.7	2,153.0
2007	139.6	394.4	14.7	148.5	740.6	676.5	2,406.8
2008	358.1	823.8	260.6	188.4	475.9	608.2	3,288.5
2009	787.7	749.7	268.6	226.5	776.6	616.2	3,728.1
2010	1,092.1	817.6	352.9	258.0	1,021.5	635.2	4,519.8
2011	956.5	990.5	402.8	305.0	1,663.4	602.2	5,064.8
2012	1,095.6	1,096.2	520.4	298.0	1,974.3	630.8	5,648.1
2013	934.9	1,039.0	389.5	274.5	2,341.3	632.4	5,861.2
2014	769.9	1,189.3	519.2	310.5	2,736.3	654.5	6,215.8
2015	1,068.6	1,398.7	545.2	310.1	2,675.9	680.4	6,217.2
2016	1,162.8	1,800.0	667.4	334.2	2,640.7	744.2	6,096.8
2017	1,203.7	1,919.6	660.5	377.9	2,633.0	732.3	6,308.7
2018	1,758.9	2,202.0	897.4	360.5	2,338.0	693.0	6,390.4
2019	1,960.7	2,576.6	1,040.6	358.4	2,543.9	662.7	6,819.0

Source: Sifma